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USING THE LOAD CURVE IN CENTRAL-STATION ADVERTISING.

Familiar as is the ordinary central-station load curve to the technical man, the general public still has but a dim conception of its usefulness, and in emphasizing the value of diagrams of this character in the daily press, the central-station manager may do much to educate his patrons to a better realization of his operating difficulties and the way in which he meets them. The rising cost of living in the past decade has been shown diagramatically in many magazine articles dealing with the price of particular products, so that the publication of a load curve with a simple explanation of its purposes and meanings is bound to interest intelligent people, no matter how little they may know about electricity. In no better way can the desirability of off-peak demands upon the system be explained to the layman, provided the contrast is made between the ease of storing gas in a holder and the economic difficulties of storing electrical energy in stationary plants.

In a recent issue of a daily paper published in its territory, the Edison Electric Illuminating Company, Boston, Mass., turned a portion of its station load curve to excellent account by showing the effect of a sudden demand for lighting service during an unexpectedly dark forenoon. The company published the section of the curve of daily output from 7 a. m. to noon, showing on the same sheet the preceding day's load during the same hours, and pointed out that within an hour the users of its service called upon the plant for additional lighting equivalent to 480,000 tungsten lamps of 20 candlepower. This increased the station output by about 12,000 kilowatts, which the company stated was greater than the total capacity of the next largest electric lighting plant in the state and 1.5 times the capacity of the second largest installation. The statement which was issued pointed out that this emergency supply hardly made the steam gauges on the boilers in the main generating plant waver, and the reader was thus led to draw his own conclusions regarding the reliability and sufficiency of the service. The curve and its accompanying comments were freely accorded space in the reading columns of the paper, and illustrated the ease with which even some of the more technical phases of central-station work can be made interesting to the public.

Perhaps the most valuable educational application of a central-station load curve can be made in explaining to the public the reasons why power rates

and lighting rates differ, together with differences between charges in force for motor service at certain hours as compared with other periods of the day. Even the layman can soon be brought to realize the importance of filling the valleys in the load curve, its relation to the heavy investment required to handle the peak output of the day or year, and the necessity for holding men and machinery in reserve against sudden and unexpected demands from consumers. Each local load curve has its own mission and teaches its local lesson, and the company which makes the most of this highly suggestive method of technical publicity is bound to find that the purchasers of its service appreciate to some degree at least, the problems of its management and the vigorous efforts to solve them.

THE CONSOLIDATED RATE CASE.

In the department of Public Service Commissions will be found this week a report of the decision of the Maryland Commission in the cases instituted for the purpose of reducing the rates of the Consolidated Gas, Electric Light & Power Company. This company supplies both gas and electric energy to the city of Baltimore. It represents the consolidation of a number of original gas companies and at the time of consolidation a large amount of securities had been issued which did not represent any actual investment. According to the decision of the Commission, written by Chairman Laird, this watering was in excess of $11,000,000.

This case is probably the most important which has yet been decided by the Public Service Commission of Maryland and there are some features of it which may well elicit particular attention.

An appraisal of the company's property had already been made by a firm of engineers employed by the company itself, and this work was not entirely duplicated by the engineers for the Commission. There was, however, a difference in the totals reached by the contending engineers due to different allowances for overhead charges, cost of preliminary organization, etc. The final value allowed by the Commission for the property of the company was intermediate between the figures found by the two appraisals.

An interesting item in this figure for value accepted by the Commission was an allowance of $5,000,000 for easements, or the rights of the company to the use of the streets of the city. For purposes of taxation these easements are assessed at $5,000,000, and, in the opinion of the Commission, they could not, therefore, be valued at less than this amount for rate-making purposes. This sets a precedent which may be troublesome to the Commission in future cases, since the value allowed for these easements is not inherently different from a franchise value. In some states the laws specifically forbid any allowance for the value of a franchise, and the general trend of present opinion is to the idea that none should be allowed over and above any expense that may have been incurred in securing the franchise. If a franchise has any additional monetary value it must reside in the ability to impose rates upon consumers higher than would otherwise be possible.

While the Commission does not prescribe any definite rate of return as a proper one, it indicates that the legal standard of six per cent, with some margin for uncertainties, is a general rule which should be controlling. It is evident in this decision, however, that consideration has been given to the financial history of the company and the interests of present holders of outstanding securities, and the rates finally fixed are estimated not only to supply interest upon all outstanding bonds, but also to provide a considerable amount for dividends upon stock. The sum allowed by the Commission for fixed charges, depreciation and contingencies is equivalent to 8.7 per cent of the allowed value of the property, or 7.9 per cent of the par value of the bonds. The amount allowed for fixed charges alone is equal to 6.25 per cent upon the value allowed, including easements.

A study of the text of this opinion discloses the evident intention of the Commission to maintain the credit of the company unimpaired and to give full consideration to the rights of investors in the company's securities. The apprehension which was widely held that the cut in rates would be more drastic, and which was reflected in the market quotations for the company's securities, is shown to be without foundation, and the decision will no doubt serve to give confidence to investors in Maryland properties that their rights will be fully protected by the Public Service Commission.

MODERNIZING LIGHTING INSTALLATIONS.

An important field for the efficiency engineer is the improvement of lighting conditions in mercantile establishments and industrial plants, with special reference to the withdrawal of equipment of poor economy and the substitution of more effective apparatus. In a sense the central-station commercial engineer is *ex-officio* an efficiency expert for the community served by his lines, and it is essential that more attention be paid to the problem of revamping old installations along with the equipment of new establishments with the latest types of lamps and reflectors. The modernizing of illumination has been practiced since the earliest days of the central-station industry, but less consideration has been given to the improvement of established layouts of high-efficiency lamps than is desirable. The substitution of the tungsten lamp for the carbon unit has resulted in wonderful betterments, but in too many cases the installation of the former has been accepted as the last word on the subject, and further possibilities of improvement overlooked.

In the broadest interests of the central station it is desirable that every lighting customer shall obtain

his service at the lowest reasonable cost for the quantity and quality required. This means that wherever a new type of reflector will save the consumer money, or what is of more consequence, give him better lighting for the existing expenditure per month, the central station should be ready to recommend the change, just as the progressive gas companies today devote much time and effort to the exploitation and installation of more efficient units. There can be no mistake made in popularizing such service to the utmost extent. The old-line electric light company made its dividends chiefly out of a comparatively small number of customers charged relatively high rates for lighting service, but times have changed, and today the progressive manager is as quick to show his customer where he can get better service for a given cost as he is to adopt some economical improvement in his own generating or distribution system. It is not necessary to go to great expense in studying possible economies or betterments in existing installations, for a very hurried trip past the principal electrically lighted store windows supplied by the company will in almost every town indicate desirable lines of improvement.

These include such work as the removal of mixed systems of lighting in closely confined areas, the more frequent cleaning of shades, readjustment of lamp heights to prevent glare, relocation of high-powered units used out of doors to points where the work performed by the interior lighting is not interfered with, study of existing reflectors to see whether they meet the local conditions, investigation of the possibilities of flexible metallic suspension devices in relation to varying schemes of window dressing, comparison of general and special illumination at the working plane and the examination of lighting conditions in connection with machine operation. Every central-station solicitor ought to have at his tongue's end all the data which he can obtain regarding the influence of proper lighting upon production, for the relative cost of illumination compared with the other expenses associated with the production of any manufactured article is small, and yet it would be difficult to show where a given expenditure for betterment will bring forth a more certain reward.

The art of illumination is advancing with very rapid strides, and while the progress of the last few months has been striking along the line of the production of highly artistic and expensive types of shades, there is still opportunity to improve many existing installations at comparatively small expense and by the use of equipment of well known stock types. Such work makes an excellent "rainy-day" job for the commercial central-station engineer, and it helps popularize the use of electricity along lines representing the latest practice in equipment application. American manufacturers have always been quick to discard the less efficient and effective equipment for the improved types, and the policy of so doing should be encouraged as much in the field of illumination as in the department of power supply.

COMPETITION AMONG ELECTRICAL CONTRACTORS.

While addressing an audience of electrical contractors not very long ago a man prominent in the contracting business said that the time-honored assertion to the effect that competition is the life of business sounded well enough as a general proposition, but that in the electrical contracting field competition was altogether too often the death of profit. Speaking before the same audience, another contractor cited as evidence of improvement in the conditions in his own town the fact that, of the important contracts which he had recently secured, many had been obtained without any competition at all.

Such expressions as these are very interesting, but they are quite liable to create an impression which is not intended. One might get the impression from them that the elimination of competition from the electrical contracting field is a thing to be desired and that contractors desire it. It is a fact that cannot be denied, nevertheless, that in the case of most industries competition is a necessary stimulus to progress and improvement; electrical contracting offers no important exceptions to the rule. Moreover, experience has shown that the elimination of competition is usually quite liable to promote monopoly, and monopoly is wrong in principle and nearly always bad in practice.

But, after all, the really proficient electrical contractor has not suffered much from legitimate competition; nor need he fear that he ever will. The real contractor is as able, and should be as willing, to meet fair competition as is anybody else. It is the absurd practice of cutting prices below the actual cost of the work that has caused his business to prove unprofitable, and such a procedure hardly deserves to be dignified by being classed as competition. There have been, and still are, altogether too many men and firms engaged in electrical construction whose business policy can be summed up in the one sentence: Get the job; at a profit if possible; but get the job, anyway. It was practice like this, no doubt, that the speakers who have just been referred to had in mind. This is a practice which they had a perfect right to deplore, and one that associations of contractors are entirely justified in using all fair means to eliminate. The contractor should not be forced to be the business rival of men willing to install electric wiring for less than the cost of it.

Some remarks by Mr. Ernest Freeman, president of the National Electrical Contractors' Association, at a recent meeting of the Illinois Association of Electrical Contractors, had important bearing on this subject. Mr. Freeman explained that the national and state associations were not trying to eliminate competition so that prices for electrical construction could be pooled or boosted. The one aim in this matter, he said, was to show the contractor what the elements of cost in electrical contracting are and to convince him of the folly of trying to install work for less than cost.

Society for Electrical Development, Inc., Adopts By-Laws and Appoints General Manager and Secretary-Treasurer.

A meeting of the Society for Electrical Development, Inc., was held on January 14, 1913, at the Engineering Societies Building, New York City.

At this meeting the various work done by the Organization Committee was approved as were also the by-laws of the new society.

Immediately after the meeting of the society, a further meeting was held of the board of directors, who were selected by the associations which they represent from the various branches of the industry. The complete board is as follows:

Electric Light and Power.—Henry L. Doherty, A. C. Einstein, J. E. Montague, W. H. Johnson, J. F. Gilchrist.

Manufacturers of Electrical Apparatus.—A. W. Burchard, L. A. Osborne, J. R. Crouse, B. M. Downs, W. A. Layman.

Electric Supply Jobbers.—W. E. Robertson, W. W. Low, Gerard Swope, F. S. Price, Roger Scudder.

Electrical Contractors.—Ernest Freeman, E. McCleary, P. N. Thorpe, J. R. Strong, G. M. Sanborn.

The funds which have been advanced by the Organization Committee to carry out the organization work of the society were turned over with all records of meetings of the Organization Committee to the society, and officers of the society were elected as follows:

Henry L. Doherty, President; Ernest Freeman, A. W. Burchard, W. H. Johnson, J. R. Crouse, W. E. Robertson, vice-presidents.

The above, with L. A. Osborne, Gerard Swope and J. R. Strong, compose the executive committee, on whom will lie the heavier responsibilities of the further organization work.

Appointments were also made of J. M. Wakeman as general manager and Philip S. Dodd as secretary-treasurer.

The work of the society will be devoted to various lines of effort for the greater development of the electrical industry at large, and will be carried out along broad-gauge lines, aiming to increase in every way the uses of electricity, especially for light, heat and power.

It is a recognized fact that the time has come when it is not only possible but practical for the four different interested branches of the industry to co-operate in developing the entire business for the benefit of each and all. No one manufacturer, jobber, contractor, dealer or central station can carry out singly efficient educational work, as well as it can be carried out by cooperative effort.

In the plans of J. Robert Crouse in 1905 to organize a Co-operative Electrical Development Association were embodied practically the same thoughts, ideas and plans which are expressed in the constitution of The Society for Electrical Development, Inc., and to the inspiration given at that time belongs the credit for the present society outlined at the meeting held on Association Island, September 3, 1912.

At that meeting over one hundred representatives of interests of the contractor, jobber, central station and manufacturer met and discussed the various things that could be done to assist in the development of the electrical industry. They appointed what was called an organization committee, to lay out plans for an organization that could be assisted in and financed co-operatively by all. This committee now composes the board of directors of the new society, who advanced sufficient funds for carrying out the necessary organization work.

The membership of the society as stated in the by-laws is open to every interest in the electrical industry and the subscriptions based upon a small percentage of the gross business are so small individually that it is believed that the full co-operation of every concern in the electrical industry can be secured.

The society has the endorsement of the executive committees of the National Electrical Contractors' Association, the Electrical Supply Jobbers' Association, the executive and public policy committees of the National Electric Light Association, together with the support of a large number of manufacturers, both large and small.

British Telephone Appraisal.

According to a decision by the Railway and Canal Commission sitting as a court of arbitration in England, the British Government will pay to the National Telephone Company $62,576,320 for the transfer of the company's system to the Government. The transfer took place January 1, 1912, and the claim of the company was for $105,000,000. During the trial the parties came to an agreement as to the cost of the plant, the sum being $51,568,825. In addition to this, however, it was necessary to appraise the intangible value and the amount to be allowed for depreciation.

Wireless Communication with Germany.

It is reported that wireless communication has been carried on between the station at Nauen, Germany, and New York. This is the first time that direct wireless communication has been established between Germany and the United States.

Pittsburgh Jovians and Boosters Unite.

The Jovian Electrical League and the Electrical Boosters of Pittsburgh, Pa., were merged at a gathering of the organizations in the Fort Pitt Hotel on January 9. It was the weekly luncheon of the Jovians, the Boosters attending to complete the fusing. M. F. Knapp, statesman for the Jovians, presided. Addresses were made by G. W. Provost, president of the Boosters, and Henry Harris, chairman of the Jovian Legislation Committee.

The meetings of the merged organizations will be held on the first Saturdays of March, June and December. The weekly luncheons will continue. The annual gatherings will be held on Jovian day, September 10. The annual theater party will be held at the Nixon Theater, on February 7, the lower floor having been reserved for that date. About 1,000, it is said, will attend.

Electric Club Nominations.

At the meeting of the Electric Club, Chicago, on January 16, the report of the Nominating Committee was made by F. S Hickok, chairman, as follows: President, George C. Keech; vice-president, W. E. Keily; secretary, F. M. Rosseland; treasurer, C. W. Forbrich; board of managers, John R. Harmon, H. M. Webber, W. W. Hincher, George B. Markham and A. Balsley. The annual election will take place at the first meeting in February.

An address was made by Charles E. Nixon, of the Selig Polyscope Company, on "History of the Moving Picture from its Inception up to the Present Day." Mr. Nixon sketched the development of the moving-picture industry and stated that most of the large concerns now engaged in preparing films are combined in the Motion Picture Patents Company. Several of these constituent companies maintain extensive outfits and companies for the preparation of films, whose cost of preparation is on the average $1.00 per foot. Where exceptional scenes are staged, however, the cost may run up to $8.00 or $10.00 per foot. The company with which Mr. Nixon is connected maintains a company of 50 people in Chicago for staging performances, and other companies at Los Angeles and Tucson of 35 and 25 respectively. The company's stage in Chicago, 30 by 20 feet, is lighted by electric lamps of 100,000 candlepower. At Los Angeles there is an animal farm equipped with 300 wild animals. In Chicago there are now 500 theaters presenting moving pictures and 100 more are being built.

Mr. Nixon illustrated his talk by exhibiting moving pictures representing "The Coming of Columbus," and "The Count of Monte Cristo."

William D. Duddell.

To be elected president of the Institution of Electrical Engineers of Great Britain is an honor greatly to be desired by the most eminent. To have earned the reputation to attain this distinction one must indeed be a man of mark. Our esteemed London contemporary, the *Electrical Review,* in a recent issue said, "It will be no easy task to live up to the reputation achieved by Mr. Ferranti, but it would be difficult to find in the profession a representative more worthy than Mr. Duddell on whom the mantle of Elijah should descend."

William DuBois Duddell was born in London, 40 years ago. He served his apprenticeship with Messrs. Davey, Paxman & Company of Colchester from 1890 to 1893. From then until 1900 he took a special course at the Central Technical College. He earned the Whitworth exhibition in 1896, and a Whitworth scholarship the next year. In 1898, in conjunction with Dr. Marchant, he read a paper on "Experiments in Alternating-Current Arcs by Aid of Oscillographs." To this work Mr. Duddell brought not only a great knowledge of the subject, but a decided originality in the design of instruments and mechanical ability, which enabled him to develop a research of the highest value to the profession. His oscillograph developed at this time has won several gold medals at international exhibitions. Quoting again our London contemporary, Mr. Duddell has added largely to the number of instruments available to the electrical engineer, producing instruments which satisfy the purpose for which they are required, and his genius for investigation and for pursuing a problem until it is cleared up has led him to the publication of many important researches and to the carrying out of equally important investigations which for various reasons have not been published.

Photograph by Lafayette, Ltd

William D. Duddell,
President of the Institution of Electrical Engineers.

In his paper on "Rapid Variations of Current Through the Direct-Current Arc," presented to the Institution of Electrical Engineers in 1900, Mr. Duddell dealt with what was a side issue in a more elaborate research, the discovery of the means of producing rapid arcs by shunting the direct-current arc with capacity and self-induction. The musical arc which Mr. Duddell showed on this occasion was then a curiosity, and it has since become the basis of one of the most important of the systems of wireless telegraphy.

His later paper before the Royal Society on "The Resistance and Electromotive Forces of the Electric Arc," is the fullest solution that has been prepared upon this problem.

Mr. Duddell was vice-president of the Physical Society in 1908, since then acting as honorary treasurer of that society. In 1907 he was president of the Roentgen Society. In 1905 he was elected a member of the council of the Institution, and he had previously served as an associate member of the council in 1901. He is a Fellow of the Royal Society. He is well remembered in this country as honorary secretary to the delegates to the International Congress at St. Louis in 1904, and in 1908 he was one of the secretaries to the International Conference on Electrical Units and Standards.

Rejuvenation of Duluth Jovians.

There will be a rejuvenation of the Jovian Order in Duluth, Minn., on February 22. The prospects for a big attendance and a thoroughly fine rejuvenation on Washington's birthday are very promising. A. W. Lindgren, business manager of the Northern Electrical Company, Duluth, is Statesman for Minnesota.

Institute Board Meets.

The Board of Directors of the American Institute of Electrical Engineers at a meeting held on January 10 in New York City elected 67 associates to membership. Two associates were transferred to the grade of member and two members to the grade of fellow, and 81 students were enrolled.

The following committee appointments by the president were announced. Committee on Use of Electricity in Mines: George R. Wood, chairman, W. E. Moore, H. M. Warren, H. H. Clark, J. T. Jennings, W. A. Thomas, K. A. Pauly, C. T. Henderson, C. W. Goodale, L. S Noble, William Kelly. Special Committee on Organization and Work of Technical Committees: H. G. Stott, chairman, H. W. Buck, H. S. Putnam, C. A. Adams, P. M. Lincoln. Representatives of the Institute upon the Library Board of the United Engineering Society: Samuel Sheldon, Frederick Bedell, Dugald C. Jackson, Malcolm Maclaren, F. L. Hutchinson.

Charles F. Scott was appointed first vice-president of the Executive Committee of the Committee on Organization of the International Electrical Congress in place of W. D. Weaver, who has resigned.

It was announced that a series of four lectures will be given by E. P. Adams, professor in Princeton University, under the auspices of the Electro-physics Committee, on four Tuesday evenings, March 18, March 25, April 1 and April 8. The usual February meeting in New York will be omitted on account of the midwinter convention, which is to be held in that city in the latter part of the month.

The lectures by Professor Adams will deal with radioactivity and will offer an unusual opportunity for engineers to obtain an insight into the nature of the phenomena which have been discovered in this most fascinating field of research. They will present a general survey of the history and important results of radioactive research and the bearing of these results on modern electrical theory.

The president was authorized to appoint three representatives on the local committee of the International Engineering Congress to be held in San Francisco in 1915.

Charles E. Scribner was appointed as representative of the Institute on the Board of Trustees of the United Engineering Society for three years.

Idaho Cedarmen Meet.

The annual meeting of the Idaho Cedarmen's Association was held in Spokane, Wash., on Tuesday, January 14, 1913. The meeting was called to order by President Lindsley with practically every member company represented.

The minutes of the last meeting were read and approved.

The publicity committee, appointed at the last annual meeting, presented a preliminary report of the United States Forest Service covering a series of tests made at the Seattle Laboratory of the strength of Western red cedar and Northern white cedar, and stated that a more complete project report would be presented by the Forest Service at a later date.

The preliminary report covered a series of tests on 15 seven-inch top, 25-foot poles of each species. The Northern white cedar poles were purchased through one of the members handling them, and shipped from the Minnesota producing district. The Western poles were shipped from one of the yards in the neighborhood of Sandpoint, Idaho. In each case care was taken to secure poles representing the average grade of material.

The preliminary report from J. B. Knapp, assistant district forester, at Portland, Ore., is as follows:

"Since all tests on full-sized poles of Michigan white cedar and Idaho red cedar furnished by your association have been completed, I wish to give you a preliminary report of the results of these tests.

"In all, fifteen poles of each species were tested in an Olsen 200,000-pound Universal testing machine which had been modified with special framing to accommodate the full-sized poles. The two ends of each pole were held stationary and the load was applied at a point corresponding to the ground line after the pole is set.

"The Michigan white cedar poles were much inferior in quality to the Idaho red cedar poles, since all of the Michigan poles contained varying amounts of center rot and were very rugged due to a large number of knots, some of them of considerable size. Only three of the Idaho cedar poles showed traces of center rot and all Idaho poles were quite free from knots. The center rot and knots in poles are serious defects when the strength is considered.

"The following figures show a comparison between the strength of the two species of poles which your association contributed:

	Modulus of Rupture Lbs. per Sq. In.	Breaking Load Lbs. per Sq. In.
Michigan White Cedar	3,400	8,430
Idaho Red Cedar	6,670	18,510

"The breaking load given above is not the actual average load required to work the poles to destruction, but is the actual load modified so as to compare the poles on a basis of equal diameters. The modulus of rupture is the unit load in pounds per square inch which disregards size and length.

"A more detailed analysis of the results of these tests will be made when the computations for each pole of each species have been completed, and this information will be furnished you in the form of a project report."

The report was accepted and the committee instructed to request that a similar test be made on the cedar produced along Puget Sound.

The committee, appointed to take up with the Master Car Builders' Association the rules relative to the number of stakes and amount of wire required for loads, reported and a lengthy discussion followed.

Inasmuch as the name of the association is really a misnomer, as a very large portion of the poles handled by the members are produced in Montana, Washington and British Columbia, and only a comparatively small portion of them in Idaho, the name of the association was unanimously changed to the "Western Red Cedar Association."

The following officers were unanimously elected for the ensuing year:

President, H. C. Culver, Sandpoint, Idaho.

Vice-President, M. P. Flannery, Spokane, Wash.

Secretary-Treasurer, R. L. Bayne, Spokane, Wash.

W. M. Leavitt and E. A. Lindsley, with the president as member ex-officio, were appointed to be a committee to draft a constitution and by-laws for the association.

This committee was instructed to incorporate in the by-laws a provision for annual dues of $25, payable semi-annually, in place of the present dues of $10.

The following companies were represented at the meeting: B. J. Carney & Company, M. P. Flannery, Spokane; W. G. Chaney Company, W. G. Chaney, Spokane; E. T. Chapin Company, E. T. Chapin, Bovil, Idaho; Humbird Lumber Company, W. C. Wolfe, Sandpoint, Idaho; Lindsley Brothers Company, C. P. Lindsley, E. A. Lindsley, R. L. Bayne, Spokane; Lost Creek Cedar Company, R. C. Jones, Lost Creek, Wash.; National Pole Company, W. M. Leavitt, Spokane; Sandpoint Lumber & Pole Company, H. C. Culver, Sandpoint, Idaho; Valentine-Clark Company, E. L. Clark, Minneapolis, L. H. Clark, St. Maries, Idaho; Western Lumber & Fole Company, G. C. MacDonald, Spokane.

Reduction in Electric Casualty Insurance.

Day Baker, treasurer and chairman of the Committee on Insurance of the Electric Vehicle Association of America, has secured from one of the largest and strongest casualty companies in this country another decided reduction in the preferential rate in favor of electrics and sends the following message to the association:

"During the past two years the Insurance Committee of the Electric Vehicle Association of America has endeavored to secure a preferential rate on all pleasure and commercial automobiles operated by electricity. Not quite a year ago the committee had the pleasure of announcing a reduction of a 10-per-cent preferential rate.

"On January 6, 1913, the New England Casualty Company of Boston, a Massachusetts corporation, with a paid-up capital of $1,000,000 and a board of directors composed of prominent New England business men, many of them identified with electric interests, announced a preferential rate for electric vehicles which is approximately 20 per cent lower than the rates charged for gasoline cars.

"The committee believes that this is a great feature for the electric, as it shows that the ease of control, and the sane speeds, especially on commercial-type cars, have resulted in a showing which must please every thinking business man, and is reflected by the action of the New England Casualty Company in giving the electric vehicle a very material preferential rate over the gasoline."

Modern Illumination.

The January meeting of the Philadelphia Section of the Illuminating Engineering Society was held on Monday evening, January 13, and was a joint meeting with the Philadelphia Sections of the American Institute of Electrical Engineers and the National Electrical Light Association. It was held in the Engineers' Club. The dinner at Hanscom's restaurant, prior to the meeting, was attended by about 35 members and guests. There were 128 members and guests present at the meeting.

Three papers were presented on the subject of "Modern Illumination" by George A. Hoadley, Arthur J. Rowland and Joseph D. Israel. The papers were illustrated with lantern slides and apparatus.

Those taking part in the discussion were Messrs. B. Frank Day, Robertson, Calvert and Swanfeld. R. B. Ely explained the exhibition of Modern Illuminants. R. F. Pierce spoke on the development of mantles and gas lamps.

A smoker and entertainment was enjoyed after the meeting adjourned.

Irrigation Pumping in Southern Idaho.

By E. A. Wilcox.

This article gives illustrated descriptions of several pumping installations, with suggestions regarding equipment, maintenance and operation. Data from investigations regarding water and power requirements are included. The author is the commercial agent of the Great Shoshone and Twin Falls Water Power Company.

Were it not for the great water-power enterprises that are being developed in Southern Idaho, the irrigation pumping plant would be unknown. It is only in localities where cheap continuous power is obtainable that water can be pumped in large quantities with any degree of economy. Fortunately, the Southern part of the State is endowed with a large number of natural power sites and with a copious flow of water in the various streams sufficient to water the large bodies of rich and productive semi-arid lands that border the water courses. The Snake River through its long, circuitous route across the State drops many hundreds of feet, and affords some of the most remarkable sites for water-power development in the world. The greater number of these sites are located directly in the center of a great and growing power market, rapidly being developed through the application of hydro-electric energy to the irrigation of vast areas of fertile land by means of the motor-driven pump, and through the natural growth incident to the settling of a great irrigated empire.

In order to show what has been done and what is now being accomplished in Southern Idaho through the development of irrigation pumping enterprises, it will be necessary to describe a few of the more important projects of this nature. Heretofore, the gravity-flow irrigation system predominated, and it is only within the past three or four years that the pumping plant has become known and generally adopted as a means for reclaiming the land.

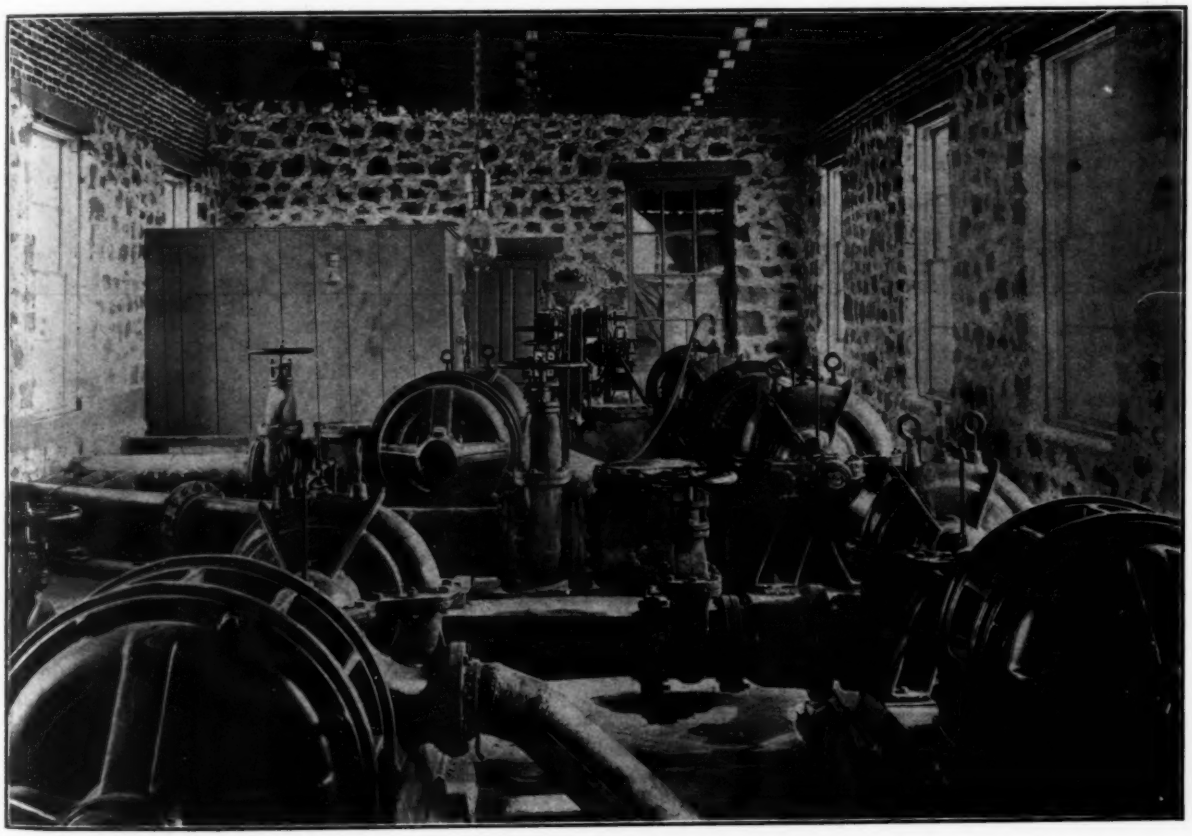


Fig. 1.—Interior of High-Line Pumping Plant.

Minidoka Pumping Project.

What is probably one of the largest and most remarkable pumping projects in the world was completed three years ago by the Government Reclamation Service near Minidoka, Idaho. In this project there are 15,000 acres of land under a 31-foot lift, 16,000 acres under a 62-foot lift, and 17,000 acres under a 93-foot lift—in all a total of 48,000 acres. There are three pumping stations; the first located at the end of the gravity canal, and lifting the water to the first level, the second about two miles distant lifting to the second level, and a third another mile distant, raising a final portion to the third level. The first plant contains four units, each of 125 second-feet capacity, and one unit of 75 second-feet capacity. The second plant contains four units of a rated capacity of 125 second-feet each, and the third

plant has an installation of two 125-second-feet and one 75-second-feet pumping units. All the pumps are of the Allis-Chalmers centrifugal vertical-shaft type. They have both top and bottom suction, and the impellers are 44 inches in diameter, and run at 300 revolutions per minute. Each pump is direct-connected to a Westinghouse 2,200-volt, 600-horsepower, synchronous motor provided with auxilliary squirrel-cage windings. The buildings are of reinforced concrete throughout. The energy for operating the pumps is furnished from a power plant at the gravity diversion dam in the Snake River.

High-Line Project.

The land under this project consists of 3,700 acres a few miles southwest of Twin Falls. There are two pumping stations, a main plant and an auxilliary plant, both of which are of heavy lava-rock construction. In the main pump house are three 100-horsepower, phase-wound, 2,300-volt motors direct-connected to 15-inch, double-suction, centrifugal pumps, which elevate the water to the 40-foot level, and cover 2,600 acres of land, and two 50-horsepower, phase-wound 2,300-volt motors direct-connected to 8-inch, double-suction, centrifugal pumps, which water 700 acres under a 70-foot lift. The water is diverted from the High-Line gravity canal through an arrangement made with the State and with the Twin Falls Land & Water Company. The auxilliary plant contains two 20-horsepower, 220-volt, phase-wound motors direct-connected to single-suction six-inch centrifugal pumps. The land covered by this plant consists of 400 acres lying 40 feet above the 40-foot canal of this project, and the water used is diverted therefrom.

Tests run on the High-Line plant have shown the wire-to-water efficiency to be approximately 65 per cent.

The pumps installed were manufactured by the American Well Works Company and the motors by the General Electric Company. The energy for operating the plant is furnished by the Great Shoshone & Twin Falls Water Power Company. The project has been in constant and successful operation for two full irrigating seasons.

Twin Falls North Side Pumping Project.

Adjoining the first and second North Side segregations are a number of tracts of choice land that are too high to be watered from the gravity canals. In order to reclaim this land, it was necessary for the Twin Falls North Side Land & Water Company to install five separate pumping plants. All the pump houses are of heavy brick and concrete construction; the transformers were manufactured by the Pittsburgh Transformer Company; the motors are of the Westinghouse C. C. L., or squirrel-cage, type; and the pumps are of the double-suction volute centrifugal type manufactured by the R. D. Wood Pump Company, with the exception of those pumps installed in the No. 5, or Little Sugar Loaf plant, which were manufactured by the Worthington Pump Company. The high-tension apparatus in each pump house is separated from the pump, motor and switchboard equipment by means of heavy screen partitions with locked doors. The entire area covered by the several plants is in excess of 18,000 acres, and the installation totals 2,400 horsepower in motor capacity.

The No. 1 plant, northwest of Milner, covers 3,000 acres with a lift of 51 feet from the canal. The machinery installation consists of three 15-inch pumps, each direct-connected to 100-horsepower motors.

The No. 2 plant, east of Milner, lifts the water 69 feet direct from Snake River, and covers 4,300 acres. The equipment consists of four 15-inch pumps, each direct-connected to a 150-horsepower motor.

Fig. 2.—Second Lift Plant, Minidoka Project.

Fig. 3.—No. 2 Plant of Twin Falls North Side Project, Showing Switchboard and High-Tension Equipment.

The No. 3 plant, west of Milner, covers 2,270 acres under a lift of 43 feet from the gravity canal. In this plant, three 12-inch pumps are each direct-connected to a 75-horsepower motor.

The No. 4, or Big Sugar Loaf plant, furnishes water for 7,000 acres by means of two lifts of 51 and 100 feet. The low-lift installation consists of three 16-inch pumps, each operated by means of a 150-horsepower motor,

and the high-lift consists of three 12-inch pumps, each direct-connected to a 175-horsepower motor.

The No. 5, or Little Sugar Loaf plant, is used to irrigate 1,600 acres under a lift of 47 feet. The installation comprises three 10-inch pumps each driven with a 100-horsepower motor.

Tests run on these plants show that the wire-to-water efficiency averages between 65 and 73 per cent. The power for operating these plants is furnished by the Great Shoshone & Twin Falls Water Power Company.

Fig. 4.—Payette Oregon Slope Pumping Plant.

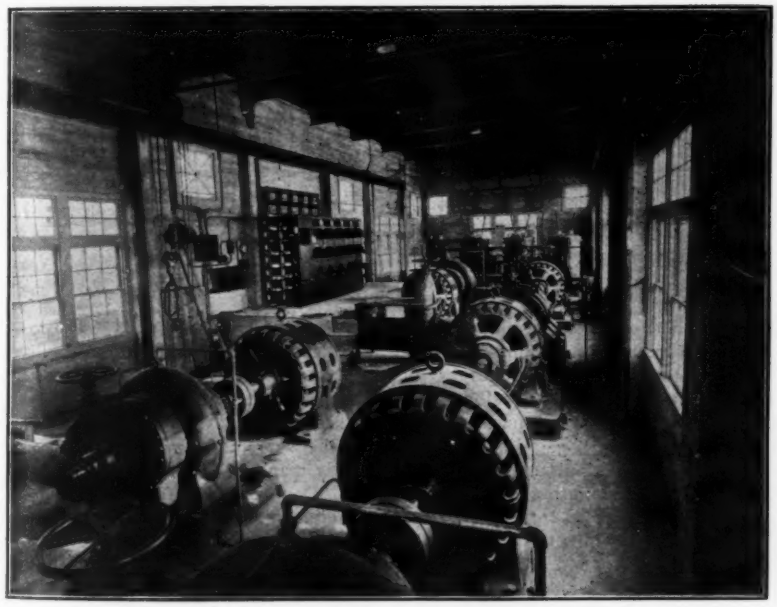


Fig. 5.—Pumping Plant of Snake River Irrigation Company's Project.

Indian Cove Pumping Project.

The Indian Cove tract is located in the Snake River Canyon southeast of Mountain Home. It comprises about 10,000 acres of land. A pumping plant has been installed to irrigate 3,000 acres under the low lift, and the surveys and plans have been completed for covering the rest of the tract by lifting the water 250 feet from Snake River.

On account of the land being held in private ownership, the project was handled in a different manner from that characterizing a majority of the Idaho pumping propositions. A construction company (The Indian Cove Reclamation Company), installed the pumping plant and irrigation system. After the completion of the works, an operating company (The Indian Cove Canal Company), composed of entrymen and settlers under the project, took over the system, giving in exchange individual water contracts. An irrigation district has since been formed by the settlers, under the plan of which irrigation district bonds will be issued and exchanged for the water contracts.

The pump house is an exceedingly well built reinforced-concrete building. The transformers and high-tension equipment are separated from the machinery room by means of a partition. Two 125-horsepower phase-wound 2,300-volt Westinghouse motors, direct-connected to 10-inch single-suction Krough volute centrifugal pumps furnish water for 1,500 acres under the 100-foot lift, and two 75-horsepower Westinghouse C. C. L. motors direct-connected to 10-inch single-suction Krough volute centrifugal pumps supply water to 1,500 acres under the 51-foot lift. The plant has been in successful operation for two full seasons. Energy is supplied to the Indian Cove Plant from the lines of the Great Shoshone & Twin Falls Water Power Company.

Snake River Pumping Project.

The total area of land under this project is approximately 15,000 acres, located southwest of Mountain Home near Grand View. The pump house is a concrete structure of massive design constructed on the north bank of the Snake River. The transformer and motor equipment are of Westinghouse manufacture and the pumps were supplied by the Worthington Pump Company. For the 57-foot lift, one 30-inch tri-rotor double-suction centrifugal pump of sufficient capacity to elevate 50 second-feet of water is employed. Two 20-inch, volute, double-suction centrifugal pumps capable of delivering 29 second-feet of water to the 108-foot lift, and two 16-inch, volute, double-suction centrifugal pumps, capable of delivering 18.5 second-feet of water to the 145-foot lift are installed. Each individual pump is direct-connected to a 450-horsepower, 440-volt, phase-wound motor. Tests made on the plant under the direction of the state engineer show an average pump efficiency of 78.6 per cent, motor efficiency of 91.0 per cent, transformer efficiency of 97.5 per cent, and a total wire-to-water efficiency of 70 per cent. The energy for operating the plant is furnished by the Great Shoshone & Twin Falls Water Power Company.

Other Pumping Projects.

In addition to the pumping projects already described in more or less detail, there are a number of other interesting pumping developments in Southern Idaho. The Payette Heights project, near Payette, covers 3,800 acres with a direct lift of 146 feet. The Payette Oregon Slope project, near Weiser, covers 7,000 acres with two lifts of approximately 40 feet and 100 feet. The Ontario Nyssa project, near Ontario, covers 7,500 acres with a direct lift of about 70 feet. The Kingman Colony project, near Nyssa, covers 2,500 acres with several lifts

varying from 30 to 70 feet. The Gem Irrigation project, now in course of construction near Caldwell, will cover 34,000 acres with lifts varying from 70 to 177 feet, and will have a motor installation of over 6,000 horsepower. The Grand View project, near Grand View, comprises 4,000 acres under a 100-foot lift. A 150-horsepower motor and a pump of 10-second-feet capacity have recently been installed for irrigating a portion of the tract.

There are thousands of acres of choice land yet in sage brush, and which have not been mentioned, that can be watered to much better advantage by means of electrically driven pumping plants than in any other manner. Between St. Anthony in the eastern part of the state and Weiser in the western part, there are at least 150,000 acres of land that will be irrigated through the agency of the electric motor and the centrifugal pump during the next few years.

The practical success of irrigation pumping in Southern Idaho depends very largely on the class of installation that is made. The cost of power will always be the largest expense factor in pumping, and the most careful attention should be given, therefore, to the arrangement and setting up of machinery, and to the details of mechanical design, material, and workmanship of the equipment. It is generally agreed that the centrifugal pump is the best type to be used for irrigation, and that electric power supplied through motors, is the most simple, reliable, and efficient kind of power that may be used for driving irrigation-pumping machinery.

Buildings for centrifugal pumping stations should be very substantial. The floors should be of concrete construction, and of proper design, not only to carry the weight, but to absorb the vibration.

Great care should be exercised in the general arrangement of the machinery, and attention should be paid to the size, type, design, and efficiency of the different units. The number of units installed should be proportioned so that a delivery capacity of from 30 to 100 per cent can be obtained without creating a demand for power much in excess of the ratio of the water delivered. Wherever possible, double-suction impeller pumps should be used, thereby permitting greater speed, and securing higher efficiency, less wear, better operating results, and, in the case of the larger pumps, less first cost. Single-suction volute pumps, in any size, are not recommended for heads greater than 80 feet, whereas double-suction volute pumps can be used with good efficiencies for heads up to 150 feet. As a rule, pumps should be provided with bronze impellers for speeds above 1,200 revolutions per minute and for heads greater than 100 feet. The runners should be designed for the maximum average working head, but the angle of the impellers should be such that with a 30-per cent reduction of head, the pumps would show good operating characteristics.

There are three types of motors that may be used for driving centrifugal pumping machinery, namely, squirrel-cage induction motors, phase-wound induction motors, and synchronous motors. The efficiencies of these machines are practically uniform for similar capacities. The squirrel-cage motor in general is recommended only for units of less than 50 horsepower. The current required for starting is from 2.5 to 4 times the full-load current, and voltage surges of serious magnitude are developed by throwing larger-capacity machines on the line.

The phase-wound motor is much to be desired for installations of 50 horsepower or over. The current required for starting is from 2 to 2.5 times the full-load current, and excessive line disturbances are avoided by the use of this type of motor. The first cost of these two types is practically the same. It is often necessary on long transmission lines, and where the units are above 100-horsepower capacity, to insist on the use of synchronous motors for driving pumping machinery. This type of motor often improves line regulation and power-factor and increases the efficiency of the transmission line where other types of motors might greatly impair the service. On account of the fact that the synchronous motor is somewhat more expensive to install and operate than induction motors, they are not generally used, except where local conditions warrant their installation.

There are many considerations that have to be taken into account in the design, construction and operation of an irrigation-pumping plant, but the features above mentioned are the ones most likely to be overlooked, at least in the preliminary work.

In order to insure the ultimate success of irrigation pumping, it is of prime importance that the cost of power be made such that the maintenance charge under the pumping project will not prove over-burdensome to the land owners; that the irrigator be kept fully advised of the best and most approved methods of handling and economically using the water at his disposal; and that practical, flexible and efficient pumping plants be installed that will produce the best results at the least cost to those under the systems.

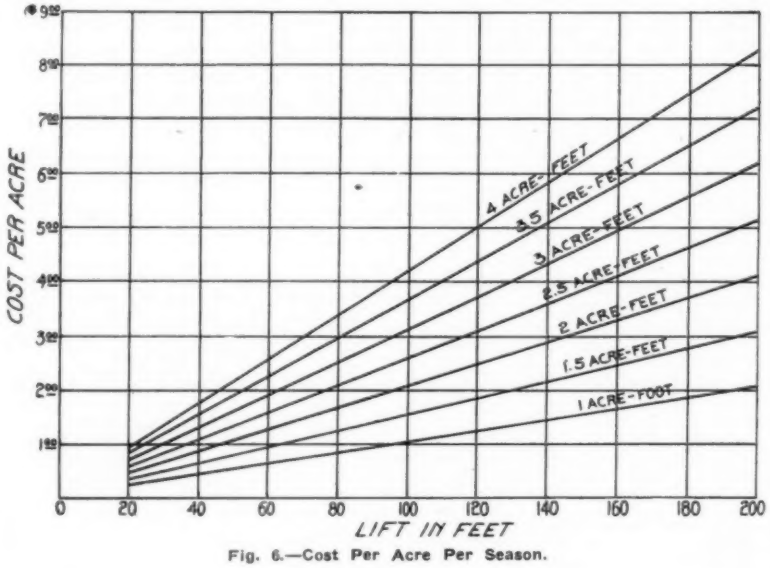


Fig. 6.—Cost Per Acre Per Season.

It is manifestly impossible for those furnishing energy for operating a pumping plant to make their charge on a basis of a certain amount for each acre under the system, for, under such an arrangement, there would be no incentive whatever for the land owner to economize in the use of water nor of the power required for operating the pumping machinery.

The method of charging that seems to have been almost universally adopted in Southern Idaho, for installations of 250-horsepower or over, is at the rate of $20 per horsepower for a six months' season, based on the maximum load recorded by a graphic meter for any half-hour of time during each entire season. Such a rate operates to the advantage of the power companies in that it insures them a revenue on the capacity investment

TABLE I.—WATER REQUIREMENTS.

Period	Bench Land 105,258 Acres		Bottom Land 26,359 Acres		Nineteen Canals 131,617 Acres	
	Acre-Feet per Acre	Per Cent. Total Diverted	Acre-Feet per Acre	Per Cent Total Diverted	Acre-Feet per Acre	Per Cent Total Diverted
April 1 to 15	0.05	1.3	0.12	2.9	0.06	1.5
April 16 to 30	0.26	6.8	0.20	5.1	0.26	6.4
May 1 to 15	0.38	9.2	0.33	8.2	0.37	9.1
May 16 to 31	0.42	10.1	0.36	8.9	0.40	9.9
June	0.88	21.6	0.41	20.3	0.87	21.3
July	0.88	21.4	0.77	19.3	0.86	21.0
August	0.52	12.5	0.64	16.0	0.54	13.2
September	0.48	11.3	0.54	13.5	0.48	11.9
October	0.23	5.8	0.23	5.8	0.23	5.7
Total	4.10	100.00	4.00	100.00	4.07	100.0

which they are necessarily called upon to keep in readiness to supply the maximum requirements demanded by the pumping plants at some time during each irrigation season. The advantage of this method of charging to the land owner lies in the fact that it allows him to cut down his power charge by intelligent and careful use of the water at his disposal. By giving his land thorough irrigation during April, May, August and September, and by the frequent cultivation of the soil and the careful use of water during June and July, the land owner may successfully cut down his expense for water to a minimum. It is a well known fact that where land is frequently cultivated, the soil retains its moisture much longer and considerably less water is required. It is becoming generally understood that the rate for pumping outlined above is mutually advantageous to both the producer and consumer of electric power, and practically no objection has been raised to it by anyone familiar with its practical application.

Fig. 6 illustrates in a general way the actual cost of power for pumping, and is based on an overall wire-to-water efficiency of 60 per cent.

It is only by a careful and intelligent study of the quantities of water used and the amounts actually required for the proper irrigation of the land and the maturing of diversified crops that the irrigator can aspire to successfully cope with the situation that confronts him, especially if his land requires a high lift.

Relative Monthly Water Requirements.

Many tests have been made on the older gravity projects to show the amount of water that is actually used during each month of the irrigating season. Table I was taken from a report of the operating irrigation engineers of Idaho for 1911. The data were compiled by W. G. Steward, assistant engineer on the Boise project.

The Boise project, on which these data were secured, is an old tract having an abundant supply of water and cultivated by farmers who are accustomed to using as much water as they wish, regardless of their actual requirements or necessities.

Various tests made on all kinds of crops indicate that the very best results are secured by using much less water than the average farmer claims to be necessary. In no case has it been found wise or profitable to use more than a half-inch (3.56 acre-feet in six months) of water to the acre, and rarely is the use of this amount justified. For convenience Table II is given herewith to show the relation between miner's inches and acre-feet, as the terms are employed in Idaho.

TABLE II.—MINER'S-INCH EQUIVALENTS IN ACRE-FEET.

Miner's Inches.	Acre-Feet—24 Hours' Use. 4 Months.	5 Months.	6 Months.
1	4.74	5.94	7.13
5/8	2.97	3.71	4.45
1/2	2.37	2.97	3.56
3/8	1.77	2.22	2.67
1/4	1.18	1.48	1.78
1/8	0.59	0.74	0.89
1/16	0.29	0.37	0.45

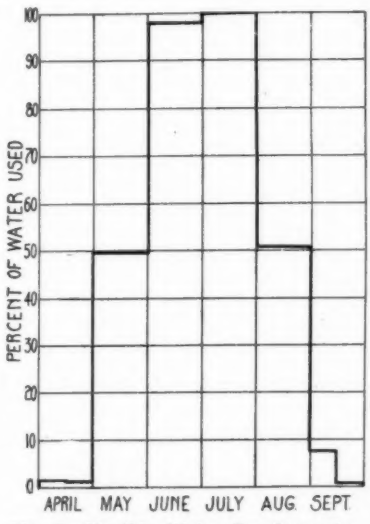


Fig. 7.—Monthly Water Requirements.

TABLE III.—RELATIVE MONTHLY WATER REQUIREMENTS.

Percentage of Total Applied Each Month During 1910 and 1911.

Months.	Lava Ash and Clay Soils.	Porous and Gravelly Soils.	Average of Both Kinds Soil.	Approximate Average Both Kinds of Soil.	Equivalent Percentage of Maximum Demand.
April	1.20	3.28	2.24	2.50	8.33
May	17.33	13.60	15.46	15.00	50.00
June	29.70	30.57	30.14	30.00	100.00
July	30.65	26.43	28.54	30.00	100.00
August	17.44	25.02	21.23	20.00	66.66
September	3.67	1.10	2.39	2.50	8.33
Total	100.00	100.00	100.00	100.00	

Table III shows the relative quantities of water usually required during the several months of the irrigating season. This information is the result of tests made by Don H. Bark, federal irrigation engineer of Idaho, during 1910-11.

Mr. Bark has made many additional tests of the actual requirements for irrigation in Idaho during 1912, and the combined results for 1910-11-12 are shown in tabulated form in Table IV.

Fig. 7 was plotted from data shown in the last column of Table IV, and illustrates the maximum water generally used during the different months.

The table and curve indicate that the best results on diversified crops are secured by using not more than 1.97 acre-feet of water on each acre of ground during the season. It also shows that very little water is required during April; that practically 50 per cent of the demand for water will come in May, 98 per cent in June, 100 per cent in July, about 51 per cent during August, about 8 per cent during the first half of September, and that very little water is required for irrigating during the last half of September.

Other investigations carried on during the past few years under the direction of Mr. Bark have brought to light many other important facts of great interest to the irrigated-land owner and especially to those living on pumping projects. The average amount of water actually wasted from 198 fields of grain during the past three years was found to be 21.3 per cent of the amount applied, and from 191 fields of alfalfa, the average was 16.1 per cent of the amount applied. This represents average irrigation, and shows that greater care should be exercised both in irrigating and in preparing the land. The investigations have shown that large amounts of water are lost in the more porous soils by deep percolation, and that this kind of soil, in particular, should be irrigated by large heads of water flooded quickly over the surface. One field,

TABLE IV.—ACTUAL WATER REQUIREMENTS.

Months.	Acre-Feet	Per Cent of Total Requirements.	Equivalent Per Cent of Maximum Demand
April 1-15	0.009	0.46	1.42
April 16-30	0.007	0.37	1.13
May	0.318	16.08	49.86
June	0.624	31.67	98.20
July	0.636	32.25	100.00
August	0.323	16.38	50.79
September 1-15	0.050	2.54	7.88
September 16-30	0.005	0.25	0.78
Total	1.972	100.00	

where data were obtained, showed a loss of 83.5 per cent of the total amount of water applied through deep percolation.

Seepage investigations have shown conclusively that the losses are much greater in small ditches than in large ones, and it is generally recommended that not less than a second-foot of water should be carried in any one ditch at any time.

It will be of interest to the careful irrigator under a pumping system to learn that very little water is needed during the early or late seasons. The average length of irrigation season for 76 fields of grain during 1910 was found to be but 46 days, and during 1911 the average for 96 fields was 35.5 days. The average length of season for 20 fields of alfalfa during 1910 was 95.4 days, and during 1911 the average for 34 fields was 122.8 days. Alfalfa, of course, requires water for a greater length of time than practically any other crop. The length of season is computed by the interval elapsing between the beginning of the first irrigation and the ending of the last irrigation.

The general technical data prepared from time to time on the use of water on irrigated land have been of invaluable service to the development of the southern part of the state, and too much importance cannot be attached to it.

It has been pointed out that Southern Idaho has been favored with most wonderful natural power resources, and that there are immense areas of semi-arid lands within the state requiring great quantities of power to furnish water for irrigating them. It has been shown that immense developments have been made both for the generation of power and for the application of power to the reclamation of the rich productive lands. Considerable data have been included also with the thought that it might possibly be of assistance in carrying out future enterprises to better advantage and with a greater degree of intelligence. It must not be overlooked that vast capital is required for the handling of great power and irrigation enterprises. Big things have been done in Southern Idaho during the past few years, and by the encouragement of capital it will be possible to continue the building and carrying on of great enterprises in a successful manner. It is only by enlisting the services of those willing to invest millions of dollars in the great power and irrigation projects of the state and content to wait for future growth and development to return them a reasonable interest on their investments that a satisfactory outcome of the local conditions can hope to be obtained.

Commercial Practice
Management, Rates, New Business

BUILDING UP A DAY LOAD FOR A SMALL CENTRAL STATION.

By William E. Haseltine.

This paper by the enterprising young manager of the Ripon Light & Water Company, Ripon, Wis., was presented before the Wisconsin Electrical Association at Milwaukee on January 16, 1913. It gives such an interesting account of how 24-hour service was successfully established in a community of less than 4,000 under most unfavorable circumstances, that it is published in full.

I have purposely changed the title of this address from "Building Up a Day Load for *the* Small Central Station" to read, "Building Up a Day Load for *a* Small Central Station," for the former presupposes the knowledge and ability to lay down principles and tell how the thing should be done, and it is the province of the small-plant manager, who has to be at once the engineering staff, the purchasing department, the auditing department, the new-business department and sole solicitor, rather to listen to you experts than to stand up here and try to give advice.

I will, therefore, not attempt to generalize, but instead, give you merely a bald narration of the problems we ourselves have been called upon to meet and how we endeavored to overcome them.

It was only after long consideration and the wearing out of innumerable pencils that we could finally make up our minds to attempt the 24-hour service, and even then it was with the expectation of having to operate several years at a loss, for we were peculiarly situated.

In the first place, if there is any city of its size in the state which seemed to offer less encouragement for the success of a venture of this kind, I have yet to hear of it. A small city of about 3,800 inhabitants, mostly retired farmers, and with practically no manufacturing establishments—a community which has not increased a soul in population in the last 20 years—do you wonder we hesitated?

The nature of our plant was another barrier. We were furnishing for commercial use 133-cycle single-phase current and for street lighting had a direct-current series arc system—the worst torture for the operating man's soul that was ever invented. Furthermore, we were tied up with a city contract on direct-current arcs extending for several years and the city authorities were prone to suspect dark and dubious designs behind any change suggested by the company. We, of course, did not wish to inaugurate a continuous service unless we could modernize our generating equipment, which meant getting rid of our direct-current arc machinery and changing to 60 cycles.

I will not worry you with an account of our trials and tribulations before we finally straightened out the street-lighting matter with a series Mazda system and decided the question of single-phase *vs.* polyphase distribution in favor of the latter, but after ordering our generating machinery and starting the rehabilitation of our distribution system we were confronted with the rate problem. This was an important matter and being without experience our first step was to find out what others were doing, to which end we obtained the schedules of a number of the smaller cities with the idea of comparing them. We found the principles upon which their schedules were based almost as numerous as the number of companies we studied, and the only way they could be compared was graphically. A chart was therefore prepared, upon which all the rates were plotted one over another, showing in a striking manner their differences and the characteristics of each.

For a number of reasons which cannot be briefly discussed we did not find any of these schedules exactly

suited to our requirements, and therefore after a conference with the Wisconsin Railroad Commission, we settled upon a system of power rates based upon the active connected load.

Our schedule is as follows: 10 cents gross or 9 cents net per kilowatt-hour for the first 60 hours' use per month of the active connected load; 5 cents gross or 4.5 net per kilowatt-hour for all in excess of the above.

The active connected load is taken as an arbitrary percentage of the total connected load varying from 100 per cent for less than 3 horsepower to 55 per cent for 50 horsepower or over. The minimum rate is $2.00 per month to which is added 50 cents for each rated horsepower installed above 4.

These rates, though adopted tentatively, have thus far worked out in a very satisfactory manner.

But the big problem was yet to be solved—we must find somebody to pay the bills.

We went over the entire town, making a list of everyone who could possibly use power (it was an extremely short one), together with the amount of horsepower in motors and various motor-driven equipment we thought would be required by each. We were entirely without experience in motor practice but we made the best guesses we could.

Then followed a round of visits to the parties on our calling list, explaining what we intended to do and the advantages of electric power, and using our best arguments to get them to agree to patronize us if we gave them the continuous service.

It was discouraging work, however. Some said positively that they would not use it, a number of them thought they would like it but had various reasons for putting it off (you all know what they were), this man would not put in a motor until he could sell his gasoline engine, this one couldn't afford it just now, while the majority of them wanted to wait and see how the other fellow came out.

We were not content with one call but repeated our visits several times and as a net result after several weeks had not landed a single one of our larger prospects and had only positively booked a meat market and a couple of printing offices.

We were almost ready to give up, but in the depths of our despair we remembered the rabbit that climbed the tree. I don't know whether you have ever heard the story or not, and I will not take time to tell it in detail here, further than to say that it concerns an old negro, who in his description of a rabbit hunt relates how the rabbit, hard pressed by the dogs, climbed a tree. "Here, uncle," exclaimed one of his hearers, "rabbits can't climb trees." "Well, dis here rabbit," replied uncle, "dis here rabbit he just done *had* to climb dat tree."

With this inspiring example in mind we sallied forth again determined that this time we *must get the business.*

The first prospect we tackled in this spirit was a creamery—possibly a bad beginning, as I have since understood that they are considered hard to land on account of the large amount of steam they necessarily use.

In our previous talks with the manager he had told us that he would like to use electricity if it cost the same as steam, or even if it cost a trifle more, but he was perfectly confident that "it couldn't be done, for," said he, "we have to have our steam anyway and then we heat our building with our exhaust and get our heat for nothing." And here we first ran up against the exhaust-steam argument. It is probably familiar to all of you. The man who uses it is actually convinced that he is getting his heat free, or, in other words, that, whether he exhausts direct through a manifold or uses a vacuum system he isn't using a pound more coal than though he was exhausting into the open air—and he is very set in his belief.

This creamery man was no exception, and to make a long story short, we made him this proposition: "Let us use our own judgment about the motors you need, their number, size and location, and we will *guarantee* that you will be satisfied with the result. If you are dissatisfied, after a fair trial, we will take them out and they will not cost you a cent."

This was a pretty big chance to take with something that we were only guessing at, but, remember we *had* to "climb dat tree."

He took us up, and we then proceeded to look the creamery over very carefully. It was being driven by a single engine and two long parallel line shafts. After studying the problem over we decided upon individual motor drive for the entire equipment, except the ripener room, where we were to install a group drive for the three ripeners. Before the installation was made, however, we decided to make this individual drive also, using special totally inclosed motors on account of the dampness. The total horsepower of the motors installed was about one-third of the rated horsepower of the engine.

This equipment operated nicely and we made some tests on it for our own information, but after it had been running a month or six weeks we went to the manager and asked him how he was satisfied. He replied that he liked the way it worked, but he still believed that it was costing them more money than their steam.

We then suggested a two-weeks' test and it was accordingly arranged to operate one week with steam and the next with electricity. It was then winter and during the week of steam operation he used his exhaust steam for heating his building, but in spite of that we were enabled to show him at the end of the test a substantial saving in favor of electricity and we have been furnishing them current ever since. This summer they put in a motor-driven refrigerating plant.

This installation was of incalculable benefit to us in giving us confidence in our product and in using it as an example to secure other business.

Our next problem was a washing-machine factory operated by steam. Here the manager was willing to put in motors for summer use, but *knew* that he could save money by operating by steam in the winter and using his exhaust steam for heating. He knew it because a friend of his who ran a machine shop in a neighboring city had told him so. Upon investigation we found that this friend of his operated his extensive machine shop with one large motor and innumerable belts and line shafts.

We finally persuaded our friend to permit us to install his motors in the fall, arguing that it was just as much for his benefit to make a test as for ours, for if his exhaust steam didn't save him anything in winter he was that much ahead in operating continuously by electricity. Here we again recommended and installed an individual-drive proposition and upon the test we won out well under the cost of steam. This firm is now building a new factory which will be equipped with motor drive exclusively.

I have gone into detail regarding these two installations because they were typical, and winning out here meant so much to us.

Our other power consumers came on gradually, not without effort, but each installation helped the next, a steam laundry, a quarry, shops, garages, etc.

Meanwhile we were not idle with the small heating devices. We picked out what we considered the best electric iron in the market, regardless of cost (for we have to live with an electrical device after it is installed), bought a quantity and proceeded to distribute them among our consumers. With each iron we sent a little folder stating that we were taking the liberty of placing in their hands this iron with the request that they try it for a time and if, at the end of 30 days, they decided they did not want to keep it to let us know and we would call and get it. Not hearing from them we would assume that they desired to retain it, and would bill it to them at the net cost to the company of $3.75, the regular price being $5.00.

We were rather unfortunate in the time selected for sending out this first consignment of irons, for it was October with its lengthening days, and, having just started continuous service, people

were using their lights at hours when they had never been accustomed to before. These were two good reasons for expecting increased bills even without the irons, and we did not anticipate any very great success, so we were more than pleased when about 60 per cent were retained.

Next spring we sent them around again, keeping in a still larger percentage. A little later we did the same thing with toasters, except that we sold these for list price, and while not as large a number of them were sold as in the case of the irons, we placed more in service than we could have done in any other way.

I do not know what the experience of other members has been, but with us the three best-selling heating appliances in their order have been: irons, toasters and warming pads.

Last summer was our first one on fans and I regret to say it was not very satisfactory, we having to carry over a large stock this winter. Perhaps the fact that the summer was exceptionally cool might account for this somewhat, although we offer it as no excuse.

Of course during all this time we were advertising in various ways, by circulars, newspapers, bill stickers, etc., and during the month of April made a special 30-day wiring offer for residences, being $1.00 per outlet for the first six outlets, and 75 cents for each one over six. Fixtures were also sold during this period at reduced rates. Altogether we broke a little better than even on these installations and quite a number took advantage of this offer.

Another item I will mention which might be of interest is the matter of electric washers. As I said before we have a washing-machine factory in our city and they were desirous of erecting a new factory building. They had received a number of flattering offers to move to other cities but being local men preferred not to do so. A conference of the Commercial Club of the city was held and it was decided that our citizens ought to show their appreciation of this industry remaining with us and a committee was sent to interview their officials and ascertain what would be most acceptable.

Previous to this the factory people had talked with us in regard to the matter and in reply to the committee stated that a purchase of 100 electric washers would please them greatly and would be good advertising for their company. The committee reported back to the club and in a few days our citizens had subscribed for the 100 machines. When these are all delivered 60 per cent of our domestic consumers will be equipped with these useful devices.

As to the effect of the first year of continuous service on the character of our station load, I will show you a couple of daily station-output curves taken during the summer.

In Fig. 1, taken June 27, you will notice that the day peak was considerably higher than the lighting peak, this being due to the fact that upon this particular day there was no public street lighting (our contract being on the moonlight basis) and the stores closed at six p. m., as they do every day except Saturday during the summer.

In Fig. 2 the power load was not quite so high, the washing-machine factory being shut down. Here the commercial lighting peak and the power peak are practically the same, this being on Saturday when the stores are open. Superposed upon this commercial lighting load, however, is the street lighting, bringing our total peak very much higher. I have also indicated upon this chart in dotted lines the load curve for a corresponding day in 1911—which speaks for itself.

Fig. 3 shows the peak-load curves

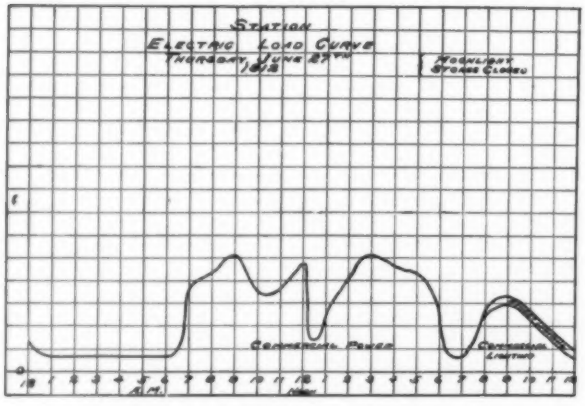


Fig. 1.—Load Curve on June 27.

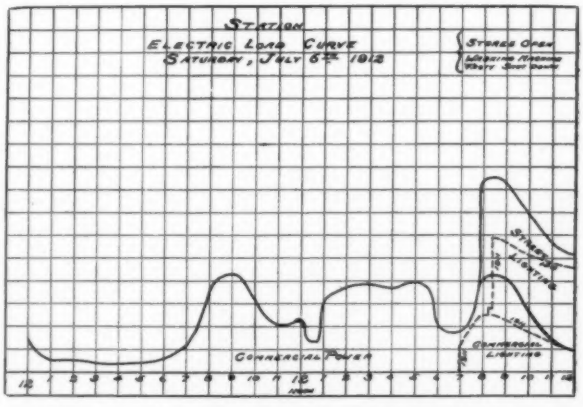


Fig. 2.—Load Curve With Street and Store Lighting.

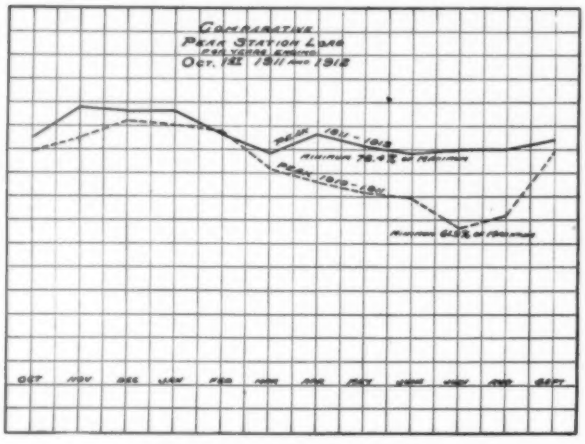


Fig. 3.—Curve of Peak Loads.

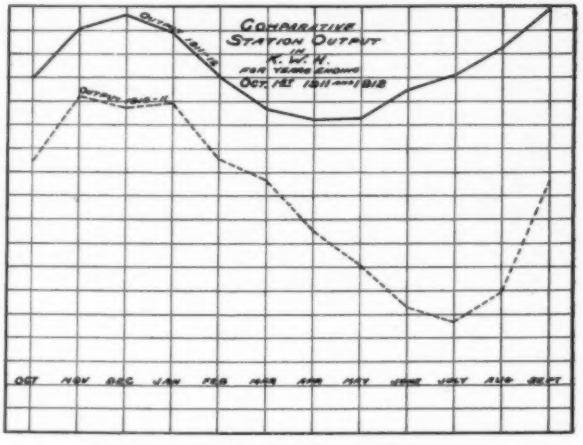


Fig. 4.—Kilowatt-Hour Output.

for the years ending October 1, 1911, and October 1, 1912, these dates being used because our continuous service began September 18, 1911. You will notice that last year's curve has flattened out considerably over that of the year before, the minimum being 78.4 per cent of the maximum, while for the previous years the minimum was 61.9 per cent.

Fig. 4 shows the comparative station output in kilowatt-hours and this indicates best of all how the hollow due to short lighting hours has been filled up. For the year 1910-11 the minimum monthly output was 33 per cent of the maximum, while for the year 1911-12 it was 73.8 per cent. You will note also that our minimum for 1911-12 was almost as great as the maximum for the previous year.

The curves of income for the two years follow in a general way the output curves except that the difference is not quite so great, due to a large part of the summer load being power and taking a lower rate than the lighting.

That we are getting much better use out of our equipment than we did before is amply indicated by the fact that, while the increase in peak load shown on the charts is but 4 per cent, the station output in kilowatt-hours for the year increased 57 per cent and the gross revenue 40 per cent.

The greatest surprise of all to us was the increase of both our domestic and commercial lighting loads due to the service being available at all times. We find that the average increase in revenue per consumer was 11.6 per cent for our commercial and 13.7 per cent for our domestic patrons and when to that is added the income from new lighting consumers the total from this source is 77.7 per cent of the entire additional operating cost of the continuous service.

As to the best method of getting new business I would not presume to give advice to those of you who have made this your life work, and who have had so much more experience than I; however, I think you will all agree with me that there is nothing that can take the place of personal solicitation.

Next to that (I speak for ourselves only) I would place newspaper advertising, especially in a small town like ours; extremely valuable are "locals"—personal items to the effect that John Jones has just equipped his house with electric lights or that Richard Smith has discarded his gasoline engine in favor of an electric motor at his garage. All of Jones' and Smith's friends will read these items and every one knows everyone else in a small town.

Office displays help somewhat too. People see them when they come in to pay their bills. I will describe one we fitted up for the Christmas season and, as I never heard of another just like it and it is extremely easy to arrange, it may interest you.

Fig. 5.—Special Display in Salesroom of Ripon Light & Water Company.

On one side of our office we placed, under a canopy of Christmas green, the life-sized figure of a lady, electric iron in hand, presiding over an ironing board. Surrounding here were various motor-driven devices, such as the electric washer, sewing machine, buffing and grinding motor, vacuum cleaners, fans, etc., while overhead were festoons of Christmas-tree lights. There was also an electrically lighted Christmas tree. By means of a home-made flasher in the basement, the different devices and lights were made to start and stop one after the other, giving a mysterious and striking effect.

This exhibit attracted to our office many who would not otherwise have come and each one had some question to ask about one or another of the appliances. A photograph of this exhibit is reproduced herewith.

In conclusion, I wish to apologize for having taken up so much of your valuable time, especially as it is only a very small number of you whom I could hope to interest, but I cannot refrain from saying to the small-company manager who is hesitating at the thought of day service: "Do not be afraid of it."

Results will not come by themselves, of course, nor will they in anything else worth doing, but I know of no department of public utility service where the same amount of effort will reap a richer reward, and if even one small company feels, because of our experience, more encouraged to extend the advantage of continuous service to its patrons, I shall be well content.

Union Electric Withdraws from Automobile Business.

The Union Electric Light and Power Company, St. Louis, Mo., has announced a change in its method of handling the electric automobile business which is of general interest.

In the early days in 1906, there were 11 electrics in St. Louis and, due to the lack of expert and intelligent attention, the industry as a whole was at a standstill there. The Union Electric Light and Power Company saw, in other localities, that the use of these cars was increasing by leaps and bounds, and, after convincing itself of the merits of the electric, it inaugurated an aggressive and comprehensive educational campaign which included the opening of garages in charge of expert electrical and mechanical men and taking local representation for well known makes of pleasure and commercial cars.

The use of the electric vehicle has steadily increased, until today there are more than 700 electrics in operation on the streets of St. Louis, and the company has now decided the time has arrived when it should withdraw from active competition in selling and garaging. It has, therefore, given up its agencies and will close its garage as a public garage just as soon as the customers can be accommodated elsewhere.

The firms which the Union Electric Company has represented will shortly open places of their own and in the future the Union Electric will act in an advisory capacity for the good of the business as a whole, some of the features of which will be close co-operation with all dealers and manufacturers, and a revision of the rate downward for electricity to charge storage batteries. C. E. Michel, the former manager of the automobile department, will continue in the employ of the company and his services will be at the command of either purchaser or dealer when desired.

Electrical Construction

WIRING IN ELECTRICAL REPAIR SHOPS.

By H. G. Wilson.

The significance of the homely saying that the children of the shoemaker have to go without shoes is often illustrated in the sort of wiring one finds in electrical repair shops and in the shops of electrical contractors. As much as some of us may dislike to admit it, very often it is true that in such places the circuits employed for light and power and for supplying the current needed in testing apparatus, give one the impression of having been installed with a view to getting something which will, in a manner, serve the desired purpose, rather than with much consideration for really good construction, or even with due regard for the requirements of the National Electrical Code. There are pleasing exceptions to this condition, however, and it is with one of these that this article is concerned. The installation which will be described was found by the writer in a repair shop which he visited in a town of medium size in the Middle West.

The construction illustrated in Fig. 1 was designed for supplying power to a workbench where tests on various types of appliances have to be conducted from time to time. The feeder circuit was run in conduit from a conveniently located cutout cabinet to one end of the bench, where a condulet fitting was employed to make connection with a horizontal run of pipe extending along the length of the bench and far enough above it not to be in the way, but at the same time within easy reach. At convenient points along the horizontal conduit, plug fittings were inserted for the purpose of taking off flexible-cord connections to apparatus located anywhere on the bench. The extension cords used are of the reinforced type, and they are secured to the wall against which the bench stands by means of single-wire cleats. The upper end of each cord is supplied with an attachment plug which can be readily pushed into one of the receptacles in the conduit. (See Fig. 1.) On the lower ends of the reinforced cords there are standard terminals for connecting up any piece of apparatus to which it might be desirable to supply current. To insure convenience in putting such appliances in circuit some of the cords have pin-plug terminals and others are equipped with terminal connections of the lug type. Small portable appliances may be attached to the circuit by means of one of the shorter cords, which are only long enough to reach the top of the table conveniently; but, for the accommodation of motors and other apparatus too heavy to be moved around readily, extension cords long enough to reach any point on the table are supplied.

The portable electrical devices in this shop—such, for example, as small drills, emery wheels and soldering irons are all equipped with receptacles into which the circuit terminals from the conduit above the table can be readily inserted. Thus there is a great saving in time and a gain in convenience over the old method of connecting an appliance by skinning the ends of the wires and inserting them in a connector or fastening them under a binding post. Moreover, the plan of cleating the extension cords to the wall makes it sure they will be at hand when wanted, and also out of the workmen's way when not in actual use. In short, this arrangement of test circuits for a workbench struck the writer as being one of the best he had ever seen. It is neat, safe and convenient, and the cost of such an arrangement is low when compared with the sort of service to be had.

In other parts of this electrical repair shop there are a rack for making tests on series arc lamps and also one for testing arc lamps of the multiple type. Fig. 2 is a sketch of the rack employed in testing series lamps and in making repairs on these. The frame of the rack is made of four-by-four-inch maple timbers, and the pieces are substantially bolted together, the right-angled joints at *A* and *B* being cut half and half and those at *E* and *D* being mortised. The other joints are gained. Thus the frame is not altogether dependent upon the bolts for rigidity. Through the timber extending from *A* to *B* bolts are passed which have washers and nuts on the upper

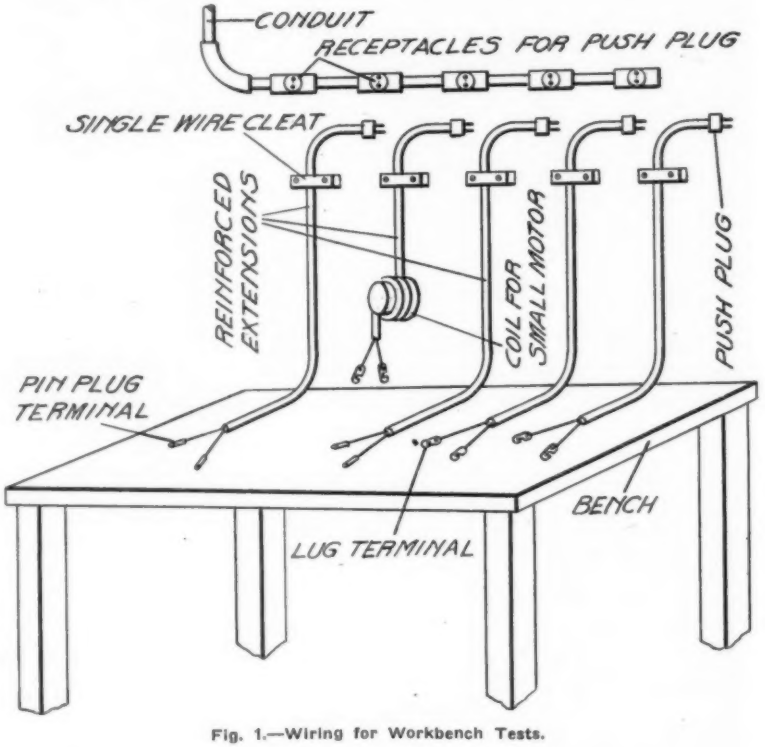


Fig. 1.—Wiring for Workbench Tests.

ends of them and hooks on the lower ends. These hook-bolts are made of three-quarter-inch iron, and are spaced approximately, as shown in the figure. They provide convenient supports for lamps undergoing tests and repairs. A regular series arc-lamp cutout switch is installed on the post shown in the left-hand side of the figure, and thus handy control of the circuit is obtained. One side of the circuit, after passing through the switch, is cleated to the back of the horizontal cross piece and control the current to a given lamp. A glance at the figure will show that a lamp on any hook may be short-circuited by closing the proper knife switch and put into circuit again by opening it. Twelve short pieces of stranded wire provided with suitable terminals are soldered to the feed wire between the knife switches and cleated to the front side of the frame and it is by means of these that connection to the lamp is made.

The frame is about five feet and six inches high, so that the lamps hang

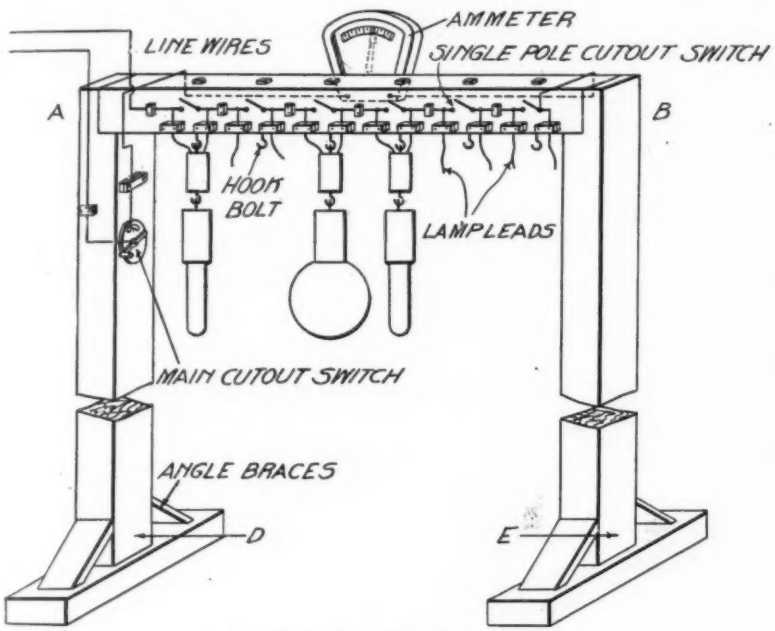


Fig. 2.—Rack for Testing Series Lamps.

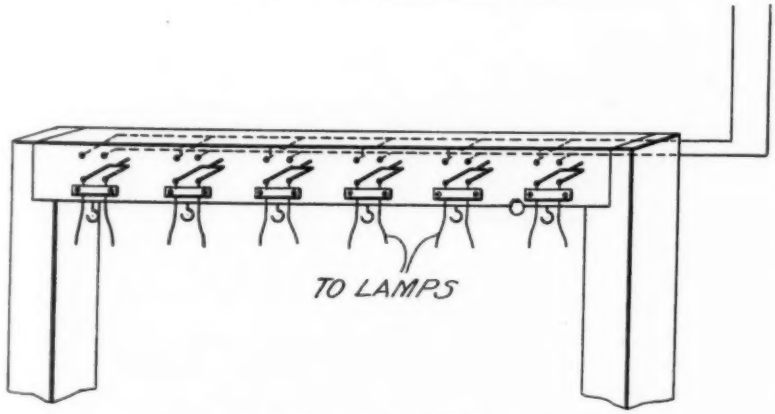


Fig. 3.—Rack for Testing Multiple Lamps.

is interrupted at a point where an ammeter is inserted. After passing through the ammeter the circuit crosses to the front side of the horizontal timber and extends along it back to the left side of the rack. In the wire on the front there is a series of six single-pole knife switches, each of which is located directly above a hook so that there may be no confusion as to what switch should be used to within convenient reach while they are being tested or repaired. As is clear from the figure, six lamps may be hung on the rack at one time and current supplied to any one or all of them as may be desired.

The test rack for multiple lamps is shown in Fig. 3. It differs from the racks already described only in that the circuit wires are run on the back of the top cross piece and bushed through it with porcelain tubes to double-pole knife switches, which are used for the control of the individual lamps. A fused cutout is provided, of course, to protect the circuit, this being located on the frame at the point where the feed wires reach it. Since lamps are kept in circuit only while under test it was thought best to dispense with the installation of fuses for each single unit.

In conclusion the writer wishes to say that he has never seen an electrical repair shop with a better design of circuits for testing purposes. The construction employed there is well worth the consideration of any contractor or central station man who has any great amount of work to do in the way of testing and repairing electrical appliances.

Baltimore Contractors.

A very interesting monthly meeting was held on Tuesday, January 14, by the Electrical Contractors' Association of Baltimore, Md., at which time the annual election of officers was held. This resulted in the election of W. D. Young, president; J. Frank Eline, vice-president; J. S. Dobler, secretary and treasurer. The Executive Committee consists of the officers and William Samuels, who succeeds his late father.

The electrical business of Baltimore has taken a decided slump within the past few weeks but the prospects for spring business are remarkable and the contractors of that city anticipate another large year, similar to the preceding one. The last year for the electrical field has been very good, small contractors frequently estimating on large contracts and finding it very profitable.

The largest contract to be awarded last week went to the Wilson-Maltmann Electric Company for the electrical installation in the superintendent's residence at Sykesville, for the insane asylum for the State of Maryland. The contract is a very acceptable one for this season of the year. Wiring will be in galvanized conduit.

Examination for Electrical Assistant.

The United States Civil Service Commission has announced a competitive examination for electrical assistant, to be held on February 26 at the usual places. From the register of eligibles appointments will be made at $1,080 per annum in the Signal Service, War Department. Applicants should secure Form 1312 from the office of the Commission, Washington, D. C.

One million four hundred and sixty-two thousand three hundred and twenty-three telegrams were handled in the United States of Columbia in 1911. The number increases about 10 per cent per year.

F. L. Decker.

Although he is one of the youngest men of any prominence in the electrical contracting field, the gentleman who is the subject of this note is well known among his fellow contractors throughout the State of Illinois, and has a large number of acquaintances in other states as well. His enthusiasm for co-operative work among contractors has given him unusual prominence.

F. L. Decker was born in Bowling Green, O., 31 years ago, and was graduated, as he says, from the school of practical experience. His earliest work was along electrical lines. Prior to his coming to Chicago, in 1902, he assisted in the equipment of a number of large industrial plants in his native state. His first work in Chicago was that of an operating engineer in steam and electrical plants. Later on he took up telephone work, and for a time was in the employ of the Western Electric Company. He became interested in the automatic telephone, and, leaving the Western Electric Company, entered the service of the Automatic Telephone Company, where he did important work under the direction of one of the chief engineers of that firm.

Mr. Decker took up electrical construction exclusively four years ago, and opened a shop and office of his own in Chicago. As soon as he entered this field he became very much interested in proper business methods for electrical contractors and began to make a special study of these. Realizing the benefits of association and mutual helpfulness among electrical contractors, he joined the National Electrical Contractors' Association, and also took an active part in the formation of what is now the Faraday Electrical Association of Chicago. He was the first secretary and treasurer of this organization, and is still one of its officials. For some time past moreover, he has been a very active member of the Illinois Electrical Contractors' Association.

At the February, 1912, meeting of the organization last mentioned, a committee, styled the Educational Committee, was appointed for the purpose of finding or devising a system of accounting adapted to the needs of the electrical contractor who has no adequate means of keeping his accounts. After almost six months of careful investigation the committee decided to adopt a system of bookkeeping which Mr. Decker had personally developed and which he recommended. The action of the committee was indorsed by the State Association at the semi-annual meeting last summer. As is noted elsewhere in this issue, Mr. Decker's activity in connection with this matter made him unusually prominent at the recent convention of Illinois Association, at Peoria.

Mr. Decker says that the thing most needed to secure for electrical contracting the sure place which it deserves among the other trades, is business training for the contractor. Oftener than not, the men who go into this work have graduated from the tool kit, and have had little or no opportunity to learn what sane business procedure is; they know how to install electrical work, but not how to charge for it. This belief has been a constant stimulus in his study of business conditions. He believes the average contractor is anxious enough to become a good business man if he is given the necessary opportunity.

Mr. Decker's work in electrical construction has been confined largely to new buildings, which have included

F. L. Decker.

theaters, store buildings, residences and apartment houses. He has done and is still doing much high-class construction in the section of Chicago where his headquarters are established.

Among the Contractors.

F. B. Bolte, East St. Louis, Ill., reports a prosperous year for his company. There was not so much building as last year, but business was satisfactory, nevertheless.

A. M. Knauber, of Oak Park, Ill., has been awarded the contract for 80 two-flat buildings, by S. T. Gunderson and Sons, builders, at Forty-eighth and Gladys Avenues, Chicago. Twenty of these buildings have already been roughed in, and work on the others will be begun at an early date. Mr. Knauber also has the contract for wiring 13 residence buildings, now being constructed by Hancock & Company, on Taylor Avenue, in Oak Park. Still another job which he has lately completed was the installation of the electrical work in the Transportation Company's building, Chicago. This was concrete construction, and the building is the largest garage of its kind in the city.

The city council at Purcell, Okla., has let the contract for furnishing, repairing and generally overhauling the electric power house and water plant to W. J. Kennedy, of Oklahoma City. The city quite recently took over the plant and the machinery was found to be in bad shape.

C. E. Stapp, of Peoria, Ill., has just finished the electrical work in the Boss Manufacturing Company's building in that city. This was a strictly high-class conduit job throughout. This firm is also installing a number of Mazda-arc lighting units in factory buildings in Peoria. On one job alone 236 of these were installed, and the total number put in during the past year amounted to 500 or more.

The Blumenthal-Kahn Electric Company, which uses "Live Wire Contractors" as the trade slogan, has closed a contract to wire fifteen houses in one of the most prominent residential sections of Baltimore; also the six-story Bee-Hive Building, located at Howard and Baltimore Streets. Both of these contracts were important ones and competition was very keen.

A. S. Schulman & Company, of Chicago, has secured from Bert Baldwin & Company, Cincinnati, O., contracts for installing all necessary electrical equipment in the new Hotel Gibson, in the Queen City.

The Central Electric Company, of Peoria, Ill., reports business to be good. It is stated that Peoria architects have never been so busy at this time of year, and hence the electrical contractors expect soon to be unusually busy.

The Peoria Electric Fixture Company is installing the electrical work in the Field House, this being a public gymnasium and playground donated to the city by the trustees of the J. C. Proctor Endowment. The building covers a whole block and only modern conduit construction was employed in the electrical work. This company is also installing new fixtures in the B. & M. Clothing Company's store in Peoria, where forty-five 500-watt lighting units will be connected up. Still other important jobs this company, of which J. L. Palmer is secretary and manager, now has on hand are the installation of the electric fixtures in the Savings Bank, Kewanee, Ill., and the Mail Office Building at Galesburg.

Convention of Illinois Electrical Contractors.

Midwinter Meeting of the State Association, Peoria, January 17 and 18.

The semi-annual convention of the Illinois Electrical Contractors' Association, which was held in Peoria last week, appeared to be one of the very best meetings of the kind which has yet taken place. The total registration was 140, this number including the visitors and the guests of the convention, of course. While the number of contractors from Chicago was relatively very large, still there was a good representation from various other towns of the state, so that this was in fact more of a state convention than is usually the case in states having one city many times larger than any of the others. Convention headquarters were at the Hotel Jefferson, where all the meetings but one were held.

The opening session was called to order at 10 o'clock in the morning, January 17, with William McGuineas, of Chicago, the president of the Association, in the chair, who; after a few remarks appropriate to the occasion, introduced Mayor E. N. Woodruff, of Peoria. Mr. Woodruff welcomed the contractors to the city in a very hearty and felicitous way, and also took advantage of the occasion to make some quite pertinent and significant remarks concerning proper business methods. Speaking from his own experience as a business man, he insisted that every business had a right to a profit and that organization was one of the most effective means of insuring sound practices in the field of every industry.

After having responded briefly to the address of Mayor Woodruff, Chairman McGuineas called upon Ernest Freeman, of Chicago, the president of the National Electrical Contractors' Association, for an address. Mr. Freeman said that while he had prepared no address for the occasion he was glad of the privilege of emphasizing the statement of the Mayor that it is right and just for men in any line of business to get together for the purpose of maintaining prices so that all can live. He spoke of the National Electrical Contractors' Association, and urged the members present to be constant and prompt in the support of that organization in its efforts to improve conditions in the field of electrical contracting. He went on to say that no member of any organization should content himself with simply being the recipient of the benefits which his membership would insure him; he must be on the alert to contribute to the progress of the organization himself, whatever the organization may be; the best practice is not to expect to receive more than is given. Mr. Freeman then called attention specifically to several ways in which each member can help the National Electrical Contractors' Association. Each member should always make it a point to answer letters promptly when these are received from officials of the National Association; during the six months he had been the National president he had sent out something like 1,000 official letters, and when these had been requests for information it had been very inconvenient not to get prompt replies.

Mr. Freeman spoke of the Society for Electrical Development, and said that the work it was about to undertake was indispensable to the greatest possible growth in the use of electricity in industrial, commercial and domestic life. He told of the aims of the Society, and said that the organization of the body was completed on Tuesday of the then current week.

At the conclusion of Mr. Freeman's remarks Mr. McGuineas remarked that Mr. Freeman had neglected to explain that he was himself the first vice-president of the Society for Electrical Development. Mr. McGuineas considered Mr. Freeman's election to this place as pleasing evidence of the growing recognition other electrical interests are now giving the electrical contractor. The chairman then referred to the importance of the work of the local association of contractors in any town or city, and enumerated some of the activities of the Chicago Association.

The president then made a request to W. J. Ball, president of the Moline Association of Electrical Contractors, to tell the convention something of the organization at Moline. President Ball stated that the Moline association was prospering and that the prospects for future growth were good. Secretary Burns of the Moline Association, having been invited by the Chairman to favor the meeting with a talk, said that he wished to endorse the remarks of Mr. Ball concerning a local organization of which he was secretary. His association was growing and the members were in hearty sympathy with the work of the state and national associations.

President McGuineas stated at this juncture that the Illinois Association was glad to see so many representatives of electrical manufacturers, jobbers and supply men present at the meeting and that he was sure the members would be glad to listen to whatever remarks these representatives might consent to favor the meeting with. He then called upon Mr. Ward of the National Carbon Company, who congratulated the Association on the good attendance in this opening session of the convention and gave assurances of his interest in all matters tending to promote the welfare of electrical contractors.

T. D. Sweet, representing C. S. Knowles, of Boston, was next invited to make a few remarks. He spoke briefly of some of the new electrical fittings which his company has placed upon the market. Following Mr. Sweet, P. H. Hensell, of the Couch Telephone Company, spoke of the help the electrical contractors had been to him in pushing his business in the Chicago territory.

Mr. Hensell was followed by E. E. Ryan, the Peoria representative of the Federal Sign Company. Mr. Ryan's talk gave evidence of an unusual intimacy with the conditions in the electrical contracting field and of deep sympathy with all efforts to improve business conditions among contractors. He had lately made an extensive tour of the country, visiting central stations and contractors, and his remarks upon conditions as he found them were interesting and helpful.

At the request of Mr. McGuineas, C. W. Beach, of the Adams-Bagnall Company, addressed the meeting briefly. After a word or two concerning the products of his company, he spoke of the relations that he thought should exist between the contractor on the one hand and the electrical jobber on the other. He should like to see the time come when the jobber would not find it necessary to maintain any retail department at all, but would find it sufficient to have his sales force call upon dealers and contractors at intervals simply for the purpose of keeping up interest in their products. Mr. Beach was in hearty sympathy with the contractor's efforts to maintain prices.

R. B. Scutter, of the Wesco Supply Company, said that his firm liked to sell its products through the contractor. When an inquiry comes in from a consumer the firm, instead of filling the order directly, usually tried to make the sale through some electrical contractor or other.

A. E. Morrow, of H. T. Paiste Company, explained that it was the practice of his company to have its representatives call upon the contractor and interest him in the particular product or products to be marketed and thus get the contractor to make demands on the local jobber, which would result in the jobbers handling the company's goods. He assured the meeting that he found the contractor a good man to do business with.

Another manufacturer's representative called upon by the chairman was Albert A. Guardia, of the Pelouze Manufacturing Company. Mr. Guardia expressed his appreciation of the courtesy shown him and assured the convention of his own personal sympathy and that of his company in every movement looking toward the promotion of the electrical contracting business.

Interspersed among these talks by manufacturers' representatives, there were brief speeches by various contractors whom the chairman called upon from time to time. Among these contractors were R. W. Poelma, president of the Chicago Electrical Contractors' Association, W. J. Collins, secretary of the Faraday Electrical Association of Chicago, W. J. McKillip, of Chicago, Guy Carlton, of Bloomington, Alex S. Schulman and J. N. Pierce, of Chicago, and Ernest Freeman, president of the National Association.

Left Half of Group—Illinois Electrical Contractors' Association.

Mr. Poelma made a stirring talk on the benefits of organization and spoke especially of what this had done and was doing for the contracting business in the city of Chicago. Mr. Collins told something of the history of the Faraday Association and made some very pertinent remarks concerning the still widely existing need of education along business lines for the electrical contractor. He argued that the electrical manufacturer ought to take a livelier interest in this by spending more money in advertising his products in such trade journals as the contractor reads. Mr. McKillip thought that too much could be done in the matter of raising prices; the higher the prices are the greater is the temptation for inexperienced and untrained men to become electrical contractors. Prices should be the last thing to come up in a contractors' association, he thought. He also contended that it was not good business to try to get every man who claimed to be a contractor to join the contractors' association; irresponsible members were a serious handicap to the progress of the association, in most cases. Mr. Carlton spoke of his pleasure in being present and said that the trouble with the contractor was that he did not figure his work right. The common practice of taking a job of electrical construction simply for the pleasure of getting the job was folly of the rankest order. Whatever success he himself had been able to attain had been due largely to the observance of strict business principles in the management of his affairs as a contractor.

Mr. Schulman emphasized the value of organization among contractors and spoke particularly of the duty of the contractor to make something out of himself. He insisted that the electrical contractor should appreciate the importance of his profession among the electrical trades and should conduct himself and his affairs in such a manner as to insure the respect and confidence of everybody with whom he did business. Continuing, Mr. Schulman remarked that the electrical manufacturer could confer a favor upon the electrical business in general, and upon the public as well, by cutting off the credit of unreliable contractors, especially the credit of those who indulge in the practice of selling goods below cost. Cutting off the credit of these men would result in their being driven out of the business or else in a speedy change in their way of conducting their affairs. The speaker contended also that electrical contractors have great need of an electrical credit association. Such an association should make it easy for the contractors to get information as to what general contractor or property owner had the habit of not paying his bills promptly, and thus the electrical contractor could avoid the now frequent handicap of having funds which he needs badly tied up in jobs long completed.

President Freeman of the National Association said that it was possible that a false impression existed in some quarters concerning the attitude of associations of contractors toward the prices for electrical construction. There was no disposition, he declared, on the part of any association that he knew of to boost or pool prices on electrical work. The aim of organization among electrical contractors in the matter of prices was only to educate its members to observe costs properly. It was intended to emphasize the necessity of taking into account overhead costs and all the other items of expense which enter into a job, and there was no disposition toward monopoly or unreasonable and excessive charges.

J. N. Pierce said that a good way for the contractor to get business was to convince the prospective customer that he was a real specialist along his line. In his own case, for example, there had been jobs where the customer was especially anxious to secure a high grade of illumination, and his own firm had secured the job because it had the data for convincing the customer that its

members were specialists in work of this character.

Systems of Accounting for Electrical Contractors.

The first paper of the afternoon session on Friday, January 17, was read by F. L. Decker, of Chicago. He spoke on the system of accounting recently adopted by the Illinois Electrical Contractors' Association (See ELECTRICAL REVIEW AND WESTERN ELECTRICIAN, November 2, 9 and 16, 1912). Mr. Decker's address was fully illustrated with stereopticon slides of the different forms made use of in the system in question, and, by following up an actual job from the time the contract was secured until the work was finished and the final collections made, the speaker gave a careful explanation of how the forms are employed. Mr. Decker also exhibited some lantern slides made from photographs of the party which went to the Yellowstone Park from the National Association convention at Denver, last July.

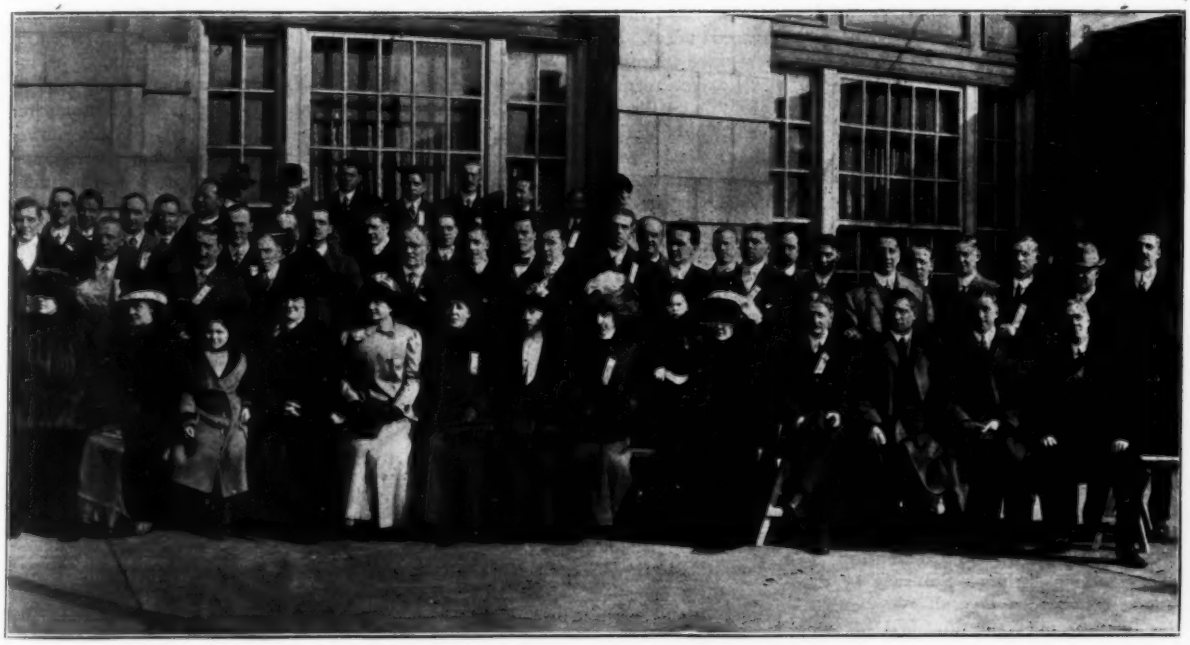
The first discussion of Mr. Decker's address was by W. J. Ball, of Moline, who explained the system of accounting used by the Tri-City Electric Company, with which Mr. Ball is associated. He showed a full set of the blank forms which his company uses.

At the request of President McGuineas, A. S. Schulman, of Chicago, discussed Mr. Decker's paper at some length, speaking especially concerning overhead expenses, a subject which Mr. Decker had referred to a number of times. Mr. Schulman thought that no hard-and-fast rules for estimating overhead costs could be followed. These costs are clearly affected by the sort of office and construction organization the contractor maintains, and hence in estimating overhead costs, there is always need for the exercise of good judgment on the part of the individual contractor. Mr. Ball remarked in this connection that he found it good practice to figure overhead costs at so much per man per hour; the actual overhead in any given case depended upon what percentage of the job was labor and what percentage was material.

Alex. M. Knauber, of Oak Park, Ill., said that the system of accounting described by Mr. Decker was exceedingly simple and inexpensive. Every contractor needed a girl in his office to answer the telephone and write his letters, and, unless the volume of his business was unusually large, this girl could easily be trained to do all necessary accounting, if the contractor was using the system of bookkeeping described by Mr. Decker. Emphasizing the necessity of a well arranged system of cost-keeping, Mr. Knauber spoke forcefully of the need of improvement along lines such as these. The electrical contractor, he asserted, is the only business man who will attempt to fix the selling price of any commodity without first knowing the cost of it. Coming to the subject of cutting prices below a living scale, the speaker said, "If your competitor wants to take a job below cost, let him have it; let him have all the business that he will take in this way; he won't be your competitor long, for his own practice will soon put him out of the contracting business altogether."

J. T. Marron, of Rock Island, who was on the committee with Mr. Decker, said that this committee had not proposed to find a system of bookkeeping which should necessarily be better than that used by anybody else, nor one to take the place of that used in the office of a large contractor keeping an expert accountant on his pay roll; it was rather intended to find a simple, inexpensive system adapted especially to the needs of the contractor who has no adequate method of accounting. Mr. Marron thought the system explained by Mr. Decker fulfilled the desired purpose admirably; it was easy to understand, accurate, and practical, and the cost of the necessary books was only some eight dollars.

F. B. Bolte, of East St. Louis, Ill., also spoke favorably concerning the system of bookkeeping, and then made some very interesting remarks about the relation of the contractor to the central station. He thought the business of the central station should be to generate and sell electric current, and to maintain a showroom, where electrical appliances should be displayed but not sold.



Illinois Electrical Contractors' Association—Right Half of Group.

Other Notes on the Afternoon Session.

T. B. Buckwell, of the Peoria Gas & Electric Company, was called upon by the chairman of the meeting to talk about the central station and the electrical contractor, and what the attitude of one of these should be to the other. Mr. Buckwell explained that he had only recently come to his position with the Peoria company, but that he had been very favorably impressed with what he had seen of the Peoria electrical contractors. He said that the Peoria central station did no inside electric wiring whatever; it maintains a sales room, but appliances are sold at standard prices. The company

sells tungsten lamps at list prices and makes no free renewals; it sells 16-candlepower carbon lamps at 15 cents each. The speaker expressed the hope that arrangements could soon be made whereby the Peoria contractors, the central-station representatives and other electrical interests may get together monthly to talk over matters which affect electrical development in the city. Mr. Buckwell complimented the Illinois contractors on their association, and said that he believed in maintaining prices for electrical work. He told of a job of electrical construction which had come under his observation where the work was actually undertaken for $75 when the highest bid had been $225. He said that he did not believe in boosting prices to unreasonable proportions, but that it was folly for contractors to undertake to do wiring below cost.

At this point in the proceedings, President McGuineas presented Mr. Decker with a check for $50, which amount was contributed by the Illinois Electrical Contractors' Association in appreciation of the work of Mr. Decker in connection with the bookkeeping system referred to above.

The final event of the afternoon session was a stereopticon lecture by J. N. LaBelle, of Chicago, who is the supervising engineer of the National X-Ray Reflector Company, and who described briefly the principal lines of reflectors which his company has on the market. Photographs of reflectors of various types were shown and also pictures of a large number of typical lighting installations. The pictures were unusually good and the speaker's remarks clear and to the point. Mr. LaBelle's paper was discussed briefly by Ernest Freeman, J. N. Pierce, J. E. Latta, William McGuineas, and others.

Second Day of the Convention.

The sessions held on Saturday by the Illinois contractors were all of an executive nature and only members of the association were admitted to them. For the benefit of the press, however, it was announced at the conclusion of these sessions that the most important business transacted included a request by President Ernest Freeman of the National association for the services of F. L. Decker, with a view to arranging the system of bookkeeping which Mr. Decker had described on the previous day, for adoption by the national body. The request was granted. Mr. Freeman thought the system was too valuable to be confined to a single state.

Chicago was selected as the place for holding the June meeting of the association, and the convention passed a rising vote of thanks to the Peoria Association of Electrical Contractors for the splendid and complete arrangements which had been provided to make the meeting the greatest possible success, and for the interest which had been manifested and the help given during the two days the visiting contractors had been in Peoria.

Before the close of the final session a committee consisting of A. M. Knauber, J. T. Marron and C. E. Stapp was appointed to devise methods to assist local associations in any of the towns of the state in settling any difficulties in which outside help might be needed. It was voted that whenever such a step might become necessary, one or more of the committeemen mentioned might visit any town or city in the state for the purpose of carrying advice and assistance to contractors there.

The Banquet.

On Saturday evening 150 of the electrical contractors and their guests participated in a banquet, at the Hotel Jefferson, and a more successful event of its kind one seldom witnesses. After an excellent six-course dinner, during which splendid music was rendered by specially engaged talent, had been disposed of, there were addresses by William McGuineas, Ernest Freeman, Charles B. Kreider, LeRoy A. Mills, H. M. Buckler, E. E. Ryan, Clark Methot and P. G. Rennick. All of these gentlemen spoke in the happy vein befitting the occasion, but throughout the talks there were many remarks of a thoughtful, helpful nature concerning electrical contracting. A little before eleven o'clock the banquet came to an end, and there passed into history a convention which will be remembered by many as a landmark in the growth of the electrical contracting business.

University of Illinois Electrical Show.

On February 6, 7 and 8, 1913, in the electrical laboratory of the University of Illinois, the students of the Department of Electrical Engineering will give their triennial Electrical Show. Although under student management, it will be by no means wholly a student show, as many manufacturing and sales companies in the electrical trade will offer exhibits. Among the exhibits will be lighting plants, heating and cooking accessories, telephone, telegraph, and wireless apparatus, lifting magnets, motor controllers, high-frequency machinery, and a complete electrically operated cafe. Student demonstrators or manufacturers' representatives will be in charge of each exhibit. One special feature planned in connection with the show is an exhibit of all types and methods of electric lighting. This will be in charge of students of electrical illumination, who will discuss with interested visitors the best and cheapest way of lighting their buildings.

Under the general direction of E. J. Berg, head of the Department of Electrical Engineering, a business organization composed of graduate and undergraduate students is carrying on the entire work.

San Francisco Electrical Development League Luncheon.

At the regular Tuesday luncheon of the League held on January 14, an address was delivered by J. R. Bibbins, resident engineer for Bion J. Arnold, on the growth and development of San Francisco and its transportation facilities, the address being illustrated by stereopticon views of San Francisco and other large cities of the country.

The burden of the message delivered to the League was the absolute and pressing necessity for quick and determined action by San Francisco in making due preparation for the growth that is to come, by building extensions to its transit lines, by constructing tunnels to develop the immense acreage of attractive but unpopulated residence territory and secure the necessary intercommunication between isolated districts, and by working out a system of finance by means of which the present unsatisfactory relation between the city and its transit systems may be improved. In analyzing the growth and development of other cities as compared with San Francisco, Mr. Bibbins showed plainly that there was not the slightest cause for apprehension for the future, but rather that San Francisco occupies an enviable position among the large cities of the country with respect to the inherent possibilities of development through short-haul and high riding habit of its citizens. This fact, he stated, should make it particularly easy for this city to improve its opportunities and reach a satisfactory and permanent settlement of the perplexing questions now confronting it. The absolute inadequacy of the city's purchasing power for the acquisition or construction of utilities was emphasized, and results from other cities were drawn upon to illustrate the immediate response of underlying property values to improved transit facilities.

Mr. Bibbins showed that municipal boundaries as they exist have practically no bearing whatever upon the broad movements of population, but rather that rapid transportation and the geography of the district alone control these movements.

Interstate Commerce Commission To Investigate Bell Telephone System.

Advices from Washington, D. C., state that Attorney-General Wickersham has turned over to the Interstate Commerce Commission all of the facts gathered in the preparation of the proceedings against the American Telephone & Telegraph Company. Mr. Wickersham has asked that the Commerce Commission make a full inquiry into the allegations against the Bell system concerning the charges of a monopolistic control of the telephone and telegraph business in this country.

Dollar Wiring Kinks.

Every reader is invited to contribute to this column. It does not matter how few words are used to explain a "Dollar Wiring Kink," provided the idea is made clear; and if a diagram is necessary, a rough pencil drawing will serve. The idea itself must, of course, be new and bright. A dollar will be sent to the contributor upon publication.

Drills for Use in Running Circuits Through Walls.

I have seen a number of descriptions of drills for making the holes necessary when running wires through walls of brick or similar material, but the drills mentioned in the following are the best, in my opinion, since they do not tend to break away the material of the wall where

Fig. 1.—Brick Drill.

the hole comes through so much as other drills do.

I make a brick drill by cutting a piece of pipe of the proper size for the hole desired at an angle, as shown in Fig. 3. For going through soft brick or "adobe," which is much used in the South, I take a common bit and file off the screw point, or feed screw, and use the bit in my brace. This makes a hole which is smooth and clean on each side of the wall and does not break the material away as is likely to be the case when a tool that has to be pounded is made use of. Using an old, much worn bit is best, because the cutting edges are worn away.

Oscar R. Brouillet.

How the Lamps Were Made to Burn.

We recently made use of a kink to get ourselves out of some trouble, which may help someone else. We had finished an ordinary knob-and-tube job of wiring, when we found that some of the lamps would not burn properly. In one room there were four ceiling lamps which were wired in on the switch correctly, and on the porch adjoining there was one other lamp.

The porch lamp, too, was wired in on the switch all right, but the main wire from this lamp was tapped to the switch wire of the four lamps just mentioned. (See Fig. 1.) This was the wireman's mistake, and, since the tap was made just above one of the four lamps, the mistake was a rather natural one: he merely got on the wrong wire. However, the mistake was discovered after the house was finished up, and to have changed the connection would have necessitated taking up part of a hardwood floor. The owner would not consent to this, but he insisted on having his lights all burn.

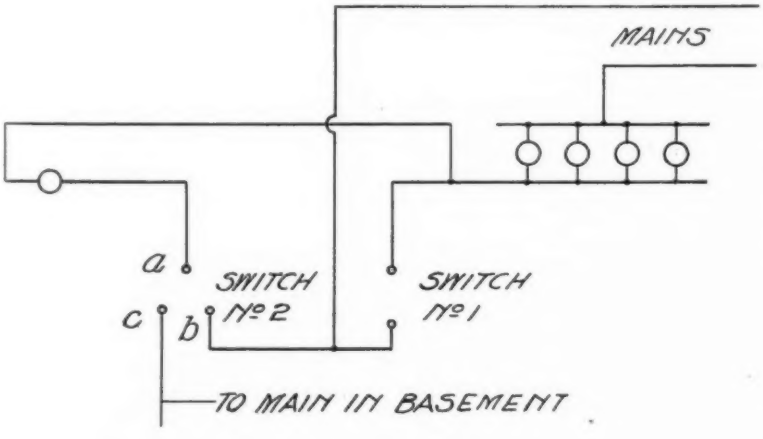


Fig. 2.—Arrangement of Circuits.

It happened to be possible to fish from the first switch to the basement below, where there were still other lamps. We substituted a three-point switch for the single-pole porch-lamp switch, fished to the basement and connected one point of the switch to the opposite side of the circuit from that in which the single-pole switch had been connected. (That is, to the lower of the two wires marked *Mains* in Fig. 1.) Having done this, we obtained light as follows: When switch No. 1 was open pushing switch No. 2 to point *b* caused the porch light to burn through the other four lamps. In this case the brilliancy of the porch lamp was not noticeably below normal, while the four lights did not show at all. When switch No. 1 was closed the porch lamp could be lighted at rated candlepower by pushing switch No. 2 to point *c*. Thus light could be obtained at either place at any time, and hence the owner of the property was perfectly satisfied with the job.

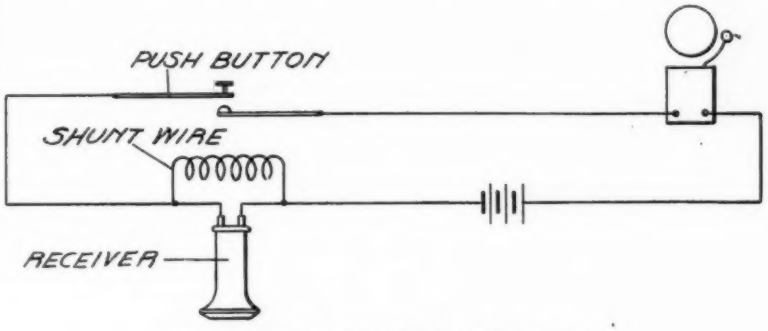


Fig. 3.—Receiver Connected for Making Tests.

This was a special case, of course, but it proved a great help to us in this particular instance.

O. M. Roberts.

Convenient Way of Testing Electric-Bell Circuit.

It sometimes happens in electric bell work that the wireman wants to know whether a bell rings or not when he can get no nearer it than the push-button switch in the circuit. The procedure I follow in such a case is to shunt a telephone receiver with a coil consisting of 10 feet of No. 18 wire, and, having connected one terminal of the receiver permanently to one terminal of the push button, hold the receiver to the ear and shunt the switch by touching the wire from the other terminal of the receiver to the free terminal of the bell circuit. (See Fig. 2.) If the bell rings, a buzzing noise will be heard corresponding to the vibrations of the bell armature. If bell does not ring, the following test can be made to determine whether bells is in circuit or not. Connect one terminal of receiver permanently to one terminal of push button and make and break connection of other receiver terminal to other push terminal. If a click is heard on making and breaking connections, the bell is in circuit and needs adjusting. If no click is heard, either the bell is open or it is disconnected.

W. C. Lockwood.

Public Service Commissions

MARYLAND.

The Public Service Commission handed down its long expected order in the gas and electric rate cases on Monday, January 13, requiring the Consolidated Gas, Electric Light and Power Company to put into effect rates of 90 cents gross and 80 cents net if paid within 10 days after the reading of the meter for gas, and a primary rate of 8.5 cents per kilowatt-hour for electricity, with a minimum charge of $1.00 per month. These rates are to become effective on July 1 next, the beginning of the company's fiscal year. The company is also directed to file with the Commission before June 1 a schedule of its wholesale rates for gas based on the amount consumed for power and other purposes, which rates shall be subject to the approval of the Commission. It is also directed to revise the terms and conditions under which electric current is supplied to its customers under the several schedules now on file with the Commission so as to conform with the primary rate.

The new order makes a net reduction of ten cents per 1,000 cubic feet of gas and a reduction of 1.5 cents per kilowatt-hour in the primary rate for electricity. The new rates will mean a saving to consumers of approximately $337,000 a year on gas and $165,000 a year on electricity.

In fixing the rates the Commission did not accept either the valuation of the company's property put on it by the company's experts, Ford, Bacon and Davis, and Howard Bruce, $27,485,102, nor the valuation made by the Commissioner's expert, Professor Bemis, who appraised the property at $15,512,610. The Commission made deductions of $5,133,576 from the Ford. Bacon and Davis valuation and allowed for depreciation the figures of Professor Bemis, $2,016,096, making a total reduction of $7,149,672, reducing the valuation to $20,335,430. Then it allowed additions to June 30 last of $1,081,984 and allowed for the valuation of easements $5,000,000, which brought up the figures to $26,417,414. This the Commission figures is the value of the physical property of the company today. Against this there is outstanding, in round numbers, $44,000,000 of securities.

In the opinion, which was prepared by Chairman Philip D. Laird, it is very strongly indicated that the end is not yet and that further reductions are likely to be made in the future. The opinion declares in favor of the sliding scale for the future adjustment of rates, intimating that if the company cannot see its way clear to the adoption of such a device, the recourse to a still further reduction of rates is open to the people.

The needs of the company are figured out by the Commission to be $5,554,276, which sum includes operating expenses, taxes, the increased price of gas oil, fixed charges, reserve and contingencies. The sum of $500,000 is allowed for reserve, $1,651,063 for fixed charges. and $150,000 for contingencies.

In ascertaining the revenue to be derived by the company, the Commission considered the probable increase in the sales of gas and electricity, using the percentages of increase in 1912 over 1911 and applying it to 1913 and 1914. It figures gas at 80 cents as yielding $3,127,303 and electricity at 8.5 cents as yielding $2,964,574, a total of $6,091,877. Deducting operating expenses of $3,253,574, leaves $2,838,664 as the net revenue. Of this the fixed charges, reserve and contingencies will take up $2,301,063, leaving a balance of $537,601.

Albert C. Ritchie, who has been assistant general counsel of the Public Service Commission since it was established, and who under an amendment to the Public Utilities Act, passed by the last Legislature, has been assigned to represent the people in cases before the Commission, has resigned.

The Cambridge Gas, Electric Light and Power Company, of Cambridge, Md., was notified by the Public Service Commission that it must stop charging its customers a meter rental of 50 cents a month each, and must not charge a rate for gas of more than $1.50 a thousand feet, as provided in the contract between the company and the Town Commissioners of Cambridge. The company had been in the habit of making a meter charge to its small customers. This, it is decided, is unlawful.

NEW YORK.

Compilations made by the Public Service Commission, Second District, show that during the 1912, 97,446 electric meters were tested under the direction of the Commission, of which 81,131 were accurate within 4 per cent, 11,621 more than 4 per cent slow, and 4,694 more than 4 per cent fast. During the year the station testing standards owned and used by companies under the Commission's jurisdiction were tested as follows: 656 rotating standards, 198 indicating wattmeters, 60 voltmeters, 44 ammeters; total, 958. Of this total, 927 were approved as accurate, 31 were disapproved and ordered recalibrated, and 33 were readjusted by the inspectors.

WISCONSIN.

The appeal of the Madison Gas and Electric Company from the provisions of an ordinance recently passed by the city of Madison has been upheld by the Railroad Commission and the ordinance declared null and void. The ordinance in question provides for the removal of all poles and wires from certain residence streets of the city with the exception of the poles required at street intersections for street-lighting purposes. It appears that the ordinance in question was prompted by esthetic considerations only and, in the opinion of the Commission, the improvement in the appearance of the overhead system, as contemplated by the utility, is all that could reasonably be expected under the circumstances. The decision calls attention to the fact, however, that should the city adopt some form of street lighting, other than the present arc system, a different question would be presented and in that event the removal of all poles would not only be desirable but necessary.

The Monticello Electric Light Company has been authorized to substitute a minimum monthly charge of 50 cents in lieu of the 10-cent meter rental now in effect.

The annual report of the Railroad Commission for the year ending June 30, 1912, has been submitted to the Governor. During the year the Commission disposed of 1,095 cases, or an increase of 392 over last year. Of this number, 248 were electric utility cases, being an increase of 63. A total of 41 decisions were issued in formal electric utility cases. A total of 1,136 utilities made report to the Commission during the last fiscal year as against 990 for the preceding year. Of this num-

ber, 244 were electric, 54 gas, 156 water, 666 telephone and 16 heating utilities.

Authority was granted by the Commission for the issue of a total of $77,615,744 in stocks, bonds and other evidences of indebtedness; the number of corporations involved in bonds, 138. Of the total sum, $5,132,687 was in stocks, $61,330,900 in bonds, $10,055,000 in equipment trust certificates and $1,097,166 in notes.

The report notes that during the year eight appeals from decisions of the Commission have been taken to the courts, but that only one has been decided, and that in favor of the Commission. But one appeal was taken from decisions involving electric utilities. The report calls attention, also, to the fact that the Commission is being called upon with increasing frequency to sit as a board of arbitration on matters of controversy between public utilities and municipalities. The questions involved are of such a nature as to be outside the Commission's jurisdiction in the ordinary procedure under the public utility law.

As evidenced by the report, the electric utility business showed a considerable development during the year. For all classes of electric railways, the value of the property and plant at the beginning of the year was $57,818,859, or an increase of 7 per cent over the figures for the preceding year. Operating revenues increased 8.1 per cent over 1911 and 14.33 per cent over 1910. The increase in net income from 1910 to 1912 amounted to 21.3 per cent. The value of plants and property of electric lighting utilities amounted to $39,933,952, an increase of 8.35 per cent over the year ending June 30, 1911. The new construction showed a decrease of 29.38 per cent over the previous year. The total operating revenues increased 8.79 per cent and the net income increased 17.05 per cent. The value of property and plant was given as $16,787,143 for telephone utilities. New construction amounted to 38 per cent for the telephone utilities.

In the matter of service inspection, it was noted that 45 electric meters were tested upon complaint of consumers and 29 were found to register within the requirements of the rule.

OHIO.

The Public Service Commission has authorized the Bedford Electric Light & Power Company, Bedford, O., to sell its entire distribution system and rights of way to the Cleveland Electric Illuminating Company. The latter is authorized to pay the sum of $22,500 for the same from the proceeds of the sale of stocks and bonds. The Cleveland Electric Illuminating Company is authorized to issue common stock of the par value of $1,500,000 and first-mortgage bonds in the same amount.

NEW JERSEY.

The Board of Public Utility Commissioners has dismissed the complaints against the Delaware & Atlantic Telegraph & Telephone Company, alleging extortionate rates. In dismissing the complaints the Board denies the claim of the company to a ten-per-cent margin of profit, holding as follows: "A return of eight per cent on the fair present value of the company's investment seems to us fairly equitable, when consideration of all conditions is taken. An eight-per-cent annual return for profit upon $5,538,000 (taken as fair present value of investment) is $427,040. The earnings and expenses indicate that in 1908 the corporate deficit was augmented by $198,085.56; in 1909, by $43,123.97; that the net earnings for 1910 were $160,756.32, and for 1911, $170,196.13. The disparity between the actual present earnings and a return of $427,040 is so large that it is not necessary to consider in detail whether the company's earnings should not be somewhat reduced by reason of royalty paid to parent company; by reason of possible excessive prices paid for supplies; by reason of possible inclusion in operating charges or overhead charges that should be deducted because of intrusion of similar items in the capitalized estimate of various parts of the plant, and by reason of estimated depreciation of parts of its property. The net profits at present are clearly not excessive, but demonstrably moderate so far as this company is concerned."

The Board's decision affects Camden and the company's neighboring territory.

The Board of Public Utility Commissioners has consented to the New York Telephone Company placing into effect a new schedule of rates, filed with it, for various sections of the state. provided that such permission does not prevent the Board from ruling upon particular parts of the schedule hereafter, should it appear that changes are essential. The revised schedule will obtain in Short Hills, Summit, Newark, South Orange, Red Bank, Rumson, Seabright, Long Branch and neighboring districts. The business rates will be reduced in 51 central-office districts, and the residence rates in 69 such.

OKLAHOMA.

The State Senate of Oklahoma has adopted a bill to confer authority upon the Corporation Commission to collect refunds which may be due from public service corporations for excess charges, and disburse the same. The bill provides that upon the ascertaining of the amount of overcharges collected in excess of any legal rate or order of the Commission, the Commission shall have authority to render judgment against such public service corporation, person or firm, which shall be a lien on its property. When collected the money shall immediately be paid by the Commission to the parties to whom it is due. The bill is of especial interest at this time because of the pendency of the controversy of the collection of approximately $60,000 in alleged overcharges by the Pioneer Telephone Company from its patrons in Oklahoma City. The company raised its rates without permission from the Commission, under authority of a city ordinance, but the Supreme Court recently held that the raise was unauthorized. The attorney general thereupon made application to the Commission for an order to require the company to refund the alleged excess charges. The company filed a counter-petition, pleading that it was unable to make a reasonable return on the rates fixed by the Commission.

Pending an investigation to be made by the Commission of the reasonableness or unreasonableness of the present rate, the Commission has granted a suspension of the order under which the company was directed to make a refund. The telephone company will be allowed to charge the rate which the company is enforcing from January 1 until the investigation is completed and the Commission's final finding made. Because the Supreme Court has held valid the order of the Commission previously made, all up to and including December 31, 1912, must be repaid, even if the Commission finds it reasonable to make a rate other than that in the order.

CALIFORNIA.

As the result of complaints presented to the Railroad Commission by telephone companies of inductive interference by high-tension power lines, the Commission has authorized the organization of a joint committee which has assumed the title of a Research Committee. The committee is made up of representatives of the various wire interests in California and representatives of the Railroad Commission and has undertaken a series of tests to throw new light on the subject. The personnel of the committee undertaking this work is as follows: Representing telephone and telegraph interests, A. H. Griswold, R. W. Gray, C. H. Temple and L. M. Ellis; representing power interests, H. A. Barre, Louis Elliott, P. M. Downing and J. E. Woodbridge; representing railroad interests, A. H. Babcock; representing the State Railroad Commission, R. A. Thompson, A. R. Kelly, F. E. Hoar and J. T. Shaw.

Questions and Answers.

All readers of the Electrical Review and Western Electrician are invited to submit questions and answers to this department. Full names will not be printed except where the writer indicates his willingness therefor. Anonymous communications will not be considered. Questions relating to electrical matters of any kind will be inserted. Answers from our readers should be received in this office preferably within ten days of the date of publication of the question, and will be published in a subsequent issue. Payment will be made for all answers published.

Questions.

No. 115.—Oil Switch.—What causes a type F, form H3, 300-ampere, 15,000-volt, General Electric oil switch to close from itself when tripped for the opening position and to open from itself when tripped for a closed position? What name is applied to an oil switch that acts in this manner?—C W. J., Chicago, Ill.

No. 118.—Aluminum Plating.—Can aluminum be electroplated on brass objects just like nickel? If so, what solution is used and what strength of current is suitable?—N. P., Fort Worth, Tex.

No. 119.—Mechanical Rectifiers.—What is the efficiency of vibrating and similar mechanical rectifiers compared with that of mercury-arc rectifiers? What is the highest current that can be rectified by them without destructive sparking? Can they be used on circuits higher than 110 volts?—J. B. D., Springfield, Mo.

No. 120.—Electric Bleaching.—I have heard the statement made that some laundries whiten or bleach the clothes artificially by sending electric current through a tank into which the clothes are put before drying. Where is this method used and how is it carried out?—M. C., Erie, Pa.

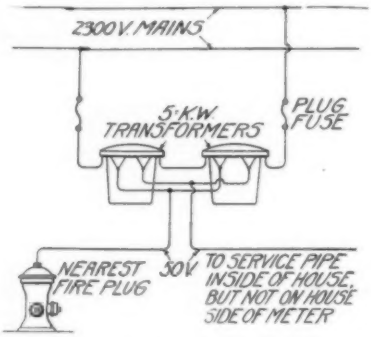
No. 121.—Combined Lock and Burglar Alarm.—Has a burglar alarm operated by the unlocking of the bolt of a lock ever been placed on the market? I have in mind a device mounted in the door jamb which would close the alarm circuit as soon as the bolt was withdrawn.—A. C. N., Mount Vernon, O.

No. 122.—Iron Pipe Underground Conduit.—Is iron pipe still used in this country to any extent as an underground duct for electric cables?—S. E., Colorado Springs, Colo.

Answers.

No. 116.—Thawing Frozen Water Pipes.—What is the best secondary voltage and size of transformer to use in thawing frozen water pipes, especially service connections from the street main to residences?—W. O., Faribault, Minn.

The question can be answered well by relating the experience of last winter with frozen water mains that the writer was called on to thaw out. We used two standard 5-kilowatt, 2,300-volt primary, 110 or 220-volt secondary, transformers and connected them as shown in the diagram. This gave us a 50-volt, 10-kilowatt secondary. A 10-kilowatt transformer that could be connected for 50-volt secondary would do, but the two five-kilowatt were more easily moved about. The arrngement shown does not


2300 V. MAINS
5 K.W. TRANSFORMERS
PLUG FUSE
NEAREST FIRE PLUG
50 V.
TO SERVICE PIPE INSIDE OF HOUSE, BUT NOT ON HOUSE SIDE OF METER

Arrangement for Thawing Frozen Pipes.

give full 10-kilowatt capacity but was quite enough for the work we had. On short runs of one-inch service pipe only three to five minutes were necessary to completely open the pipe.—H. M. P., Milford, Ill.

We are using a 20-kilowatt Westinghouse transformer (type O. D.). By changing the primary connections for 1,100 volts, that is, putting the primary coils in multiple, and connecting the secondary coils in series (using the outside wires when connected for a three-wire system) we have a ratio of 5 to 1. We connect the primary of this transformer to our 230-volt secondary lines, this giving us 46 volts for thawing purposes, which we connect directly to the water pipe, making one tap on the nearest fire plug and one in the house. This usually thaws a residence water service in from 3 to 25 minutes. If we find that we have less than 125 amperes on the pipe after the connection is made, we change the transformer connections for 2,300 volts primary and 115 secondary, and connect to our 2,300-volt primary lines, making the connection to the transformer with an oil switch, thus using 115 volts on the service. Our experience has been that from 150 to 300 amperes is sufficient for residence water services.—W. R. S., Cheyenne, Wyo.

There are several different makes of special pipe-thawing transformers, made with different secondary taps for this line of work. But, for general use regular stock transformers may be used just as well, by changing the connections to meet different conditions, if necessary. For thawing service connections it is best to use about 20 kilowatts and for convenience in handling, two or four small-sized transformers are better than one large transformer—although any size of exta transformers may be used for this work. The primary should be fused heavy, for the transformers are where they can be watched, and if overloaded for too long a time can be cut out. It is best to place a switch on the secondary side. A single-pole switch will do. The secondary should be connected for 110 volts, one side connected to the service pipe inside, and the other to the nearest hydrant, using large enough cable or wire so that it will not over-heat and burn the insulation off. Usually from 5 to 15 minutes will thaw a service pipe. But, if it should be a large service and the primary fuses blow, then two transformers may be connected in series on the primary and the secondaries in multiple on the two. This will give about 55 volts and double the amperes. If four transformers are used they can be connected in the same manner. For thawing out mains, that is from 4-inch to 6-inch pipe, about 100 kilowatts should be used connected for 55 volts.—G. B. S., Rochester, N. Y.

I would suggest the following method which I have used to a good advantage. The secondary current for thawing water mains up to 1.25 inches diameter should be 200 to 250 amperes at 50 volts from a 10-kilowatt transformer; for mains larger than this 300 amperes at 55 volts from a 15-kilowatt transformer. In connecting up an outfit of this kind I suggest the cutting in of a water rheostat to be connected on the primary side of same. Add enough salt to get the required voltage and amperage on the secondary side. Do not exceed 300 amperes, as there is a possible chance of the lead pipe connecting on the main pipe melting. I suggest that one wire be taken to the cellar of the house where water supply is off and the other leg connected to the nearest fire hydrant on the street; this saves all excavating and extra labor and saves getting permits for opening streets. In using this system a short time ago there were two adjoining houses without water and upon discovering the mains frozen I thawed the two mains at once by shunting the wire from one cellar to the other with the outside wire on a fire hydrant. The actual time taken from the time current was turned on until water flowed in the houses was 14 minutes. The outfit mentioned above can be erected on a wagon and conveyed from place to place, providing there is current in the vicinity where thawing is to be done. Making a specialty of this work in the winter time is very profitable for the one having the contract.—B. F. S., Long Branch, N. J.

In our method of thawing frozen water pipe the outfit consisted of a 10-kilowatt transformer and the necessary wire, switches, primary leads and fuse plugs. This was all mounted on a wagon and was easily portable. The transformer

used had a secondary voltage range of from 5 to about 25 and this was varied as the case required by using an adjustable resistance mounted on the transformer case. Usually about 25 volts were used as this would hurry the operation somewhat, but if the run of pipe was short and we found too much current flowing the voltage would be reduced, but with 25 volts there is little possibility of doing damage. Most of the pipes treated were small, say, half and three-quarter-inch services for house use. The time required depended on the length of the pipe also on the voltage of the circuit. Owing to the many, and sometimes peculiar, conditions that are to be met no rule can be laid down as to the current or the voltage. In some of the northern cities I would assume that the frost goes deeply enough so that on a long run of pipe the voltage might be raised to 75 or 100 volts. Again the voltage will be determined somewhat by the joints of the pipe. Where iron pipe is used there may be compounded joints and the compound may or may not be a good conductor. If not a great deal of the pipe is exposed, and the ground is thoroughly frozen with the water, the pipe alone must be the conductor. In this case the voltage will be determined by the conductivity of the joints. The resistance of the joints being fairly high, the heat will develop there and the earth will warm slightly, helping in the conducting of the current, and as this progresses the voltage may be reduced somewhat. If your questioner is purchasing a transformer for thawing purposes I would suggest one of a fairly high voltage, as in the neighborhood of the address given I understand that the frost line is deep. The voltage should range from say 25 or 30 to 65 or 75, and the capacity should be about 10 kilowatts.—D. S. J., Pittsburgh, Pa.

No. 117.—Sparking on Third Rails.—Does the sparking which takes place on the exposed third rails of the elevated railways when they are covered with sleet have any tendency to shorten the life of these rails and of the contact shoes? Does the jerky motion of the train impose severe strains on the couplings and draft gear only, or does it also affect the motors? Are motors ever burned out from this cause? Does an inverted third rail eliminate the troubles from sleet and ice?—R. E. A., Chicago, Ill.

The sparking which occurs between the third rail and contact shoe during icy weather does not shorten the life of the rail as much as that of the shoe. Small beads formed by the arcing will appear on the shoe and rail, but on account of the small surface of the shoe will wear it very quickly. The jerky motion of the train will in time have its effect on the motors, but as they are designed for such use they will stand a wonderful amount of rough work. The inverted third rail has many objections and its use is far from being common. Where it has been tried troubles from sleet and ice are not so great as on upright rails, but ice will form nevertheless. On rainy days in freezing weather the ice will form on the lower edges of the inverted rail and cause trouble, unless protected from above. On these rails also it is much more inconvenient to use sleet scrapers.—H. C. B., Chicago.

The Electric Vehicle Association Banquet to Past-President Blood.

One of the most successful affairs in the history of the Electric Vehicle Association of America was the testimonial banquet tendered to Past-President William H. Blood Jr., at Delmonico's, New York City, on the evening of Thursday, January 16. There was not a dull moment from oysters to demi-tasse, and after that any one present would have thought that such a thing as "dull care" never existed. It was perhaps the most representative gathering of electric-vehicle and central-station men that ever assembled in

William H. Blood, Jr.

New York City for a jollification in honor of one of their number. Arthur Williams, who is Mr. Blood's successor as president of the Electric Vehicle Association of America, acted as toastmaster of the evening, and in proposing a toast to the guest of honor referred to his splendid efforts in behalf of the association. Mr. Blood made a brief response in way of appreciation, and among other things mentioned that the association now represents approximately $500,000,000 of capital. Mr. Williams read a number of telegrams and several letters from prominent persons who were unable to be present. There was music a-plenty and singing in which the diners participated. Thomas E. Murray, vice-president and general manager of the New York Edison Company, favored the diners with several tenor solos which were heartily enjoyed and applauded. Several professional entertainers of high class were part of the evening's program, and it was near twelve o'clock befort the festivities ended.

The hosts of the evening were: G. H. Atkins, W. H. Atkins, R. A. Bachman, F. W. M. Bailey, Day Baker, John H. Barker, H. H. Barnes, J. Crawford Bartlett, John J. Bartram, A. K. Baylor, Joseph F. Becker, W. G. Bee, Theo. Beran, Jean E. Blaise, Charles Blizard, A. Bourquardez, Walter R. Boyd, Nicholas F. Brady, M. J. Brayton, C. H. Brennan, G. W. Brine, George H. Buzby, J. H. Cafferty, F. N. Carle, E. A. Carolan, M. B. Chase, J. S. Codman, L. A. Coleman, Frederick G. Cooper, H. C. Cushing, Jr., E. W. Curtis, Jr., Robert W. Daniels, H. L. Davisson, James C. DeLong F. S. Dellenbaugh, Jr., George Davies, Hayden Eames, C. L. Edgar, L. L. Edgar, Dudley Farrand, Henry C. Fling, W. H. Francis, W. W. Freeman, F. W. Frueauff, F. S. Gassaway, E. C. Geither, J. F. Gilchrist, Albert Goldman, E. W. Goldschmidt, J. H. Goehst, Uri B. Grannis, Emlen S. Hare, George H. Harries, Henry R. Hayes, George W. Hill, H. W. Hillman, George W. Holden, W. E. Holland, Welles E. Holmes, S. B. Howard, J. T. Hutchings, William Illch, W. H. Johnson, T. I. Jones, J. Kelly, George H. Kelly, W. P. Kennedy, F. M. Kimball, G. G. Laird, J. M. Lansden, C. L. Law, J. W. Lieb, Jr., Arthur B. Lisle, C. A. Littlefield, R. McA. Lloyd, R. L. Lloyd, W. C. Lusk, Ernest Lunn, Frank S. Marr, E. S. Mansfield, Hal Marchbanks, Converse D. Marsh, T. C. Martin, Arthur Miller, J. T. Maxwell, W. E. McCoy, W. D. McJunkin, C. E. Michel, John B. Miller, E. A. Mills, J. B. Murray, Thomas E. Murray, S. St. I. Morgan, C. A. Musselman, C. Nast, A. F. Neale, F. B. Neely, Walter Neumuller, E. A. Norman, R. C. Norton, W. H. Onken, Jr., R. F. Pack, George F. Parker, W. H. Patton, F. F. Phillips, D. T. Pierce, Charles W. Price, H. H. Price, E. L. Reynolds, Jesse Richards, Harvey Robinson, E. J. Ross, Jr., Robert E. Russell, H. T. Sands, F. F. Sampson, R. M. Searle, Charles S. Shepard, M. A. Singer, Frank W. Smith, H. H. Smith, C. W. Squires, Jr., W. G. Stetson, Charles W. Stone, Frank J. Stone, W. B. Stoughton, Dan Swander, F. M. Tait, Albert Taylor, C. I. Taylor, A. B. Tenney, C. G. M. Thomas, S. G. Thompson, H. F. Thomson, W. G. Tucker, Jr., E. F. Tweedy, P. D. Wagoner, J. M. Wakeman, L. R. Wallis, C. A. Ward, C. E. Watrous, W. F. Wells, G. W. Wesley, F. R. White, W. H. Whitton, C. L. F. Wieber, Arthur Williams, Edward T. Williams, O. D. Young, P. S. Young, R. R. Young.

A recent consular report states that there is a good demand for electric vehicles in Shanghai, China.

Indirect Illumination for General Offices.

The January meeting of the Chicago Section, Illuminating Engineering Society, was held on the evening of January 15 in the rooms of the Western Society of Engineers. Chairman F. A. Vaughn presided, and announced that arrangements had been completed for the February meeting, which will be held in Milwaukee, Wis., on February 22, in conjunction with other engineering societies. A large number of the Chicago members agreed to attend this meeting and arrangements will be made to travel upon a particular train from Chicago to Milwaukee.

The paper of the evening, entitled "Indirect Illumination for General Offices," by T. H. Aldrich and J. P. Malia, was presented by Mr. Aldrich.

This paper described the installation which has been made in the office building of Armour & Company, at the Chicago stock yards, and tests which have been made therein. The building houses 1,200 clerks. It is five years old, but is quite up to date as regards utility and welfare of the employees. It is five stories in height and built of reinforced concrete. The large offices comprise 113,750 square feet of floor area, in addition to which there are 28 private offices. The windows are large and provide good daylight illumination. The ceilings are painted a light cream. The walls are light buff above a dado line 7 feet 9 inches from the floor. Below this the walls are a light green. The paint has a matt finish and is considered preferable to kalsomine for sanitary and utilitarian reasons. Nernst lamps were used in the original installation, consisting principally of single-glower units consuming 176 watts each in four-inch alabaster globes. The consumption of energy amounted to about two watts per square foot on the average, giving an illumination on a horizontal plane of 3.1 foot-candles.

In December, 1911, and January, 1912, several trial installations were made with Mazda lamps and four different types of reflectors, of which one was direct, two indirect and one semi-indirect. Thirty-six units of these types were installed in bays of the general offices and trials were also made in three of the private offices. These trials lasted for six months, during which time illuminometer readings were taken, and the illumination efficiencies were found to be with lamps and reflectors new and clean 55 per cent for the direct, 50.7 for the semi-indirect and 38 per cent for the indirect units. Experiments were also made upon the time required for cleaning, the cost of which was found to be, for 900 units, $22.50 for direct units, $24.25 for the semi-indirect and $8.25 for the indirect units. A committee of five officials decided to adopt the indirect system of illumination, weight being given not only to cost of installation and maintenance but to the opinions of many employees as to the adequacy and hygienic value of the illumination during the tests. The average intensity was lower with the indirect units, but was considered more satisfactory on account of the uniformity and diffusion, and lack of glare and shadows. The maintenance cost was found to be 30 per cent lower than for either of the other systems. The first cost of installation was 20 per cent more than for the others.

Mr. Aldrich exhibited a large number of lantern slides showing views of the building, plans of the layout and intensity curves showing the distribution of illumination in the various bays and private offices. The necessity for cleaning reflectors in a systematic manner was emphasized, and as an example it was stated that in the barber shop, where reflectors had not been cleaned for five months, the average illumination at a number of test stations over chairs was two foot-candles. After cleaning the reflectors and lamps, this rose to four foot-candles. These results indicate an average depreciation per month of 10 per cent due to the accumulation of dirt upon lamps and reflectors. The authors advocated the use of a single unit in the center of each bay and each private office in preference to four distributed units having the same total wattage, for offices like this with ceilings from 14 to 16 feet high. The lamps in the general offices were placed 26 inches and in the private offices 36 inches below the ceiling. The use of the single units is not only cheaper, but permits of lower hanging, which has a value from the decorative standpoint. A more even ceiling illumination also results.

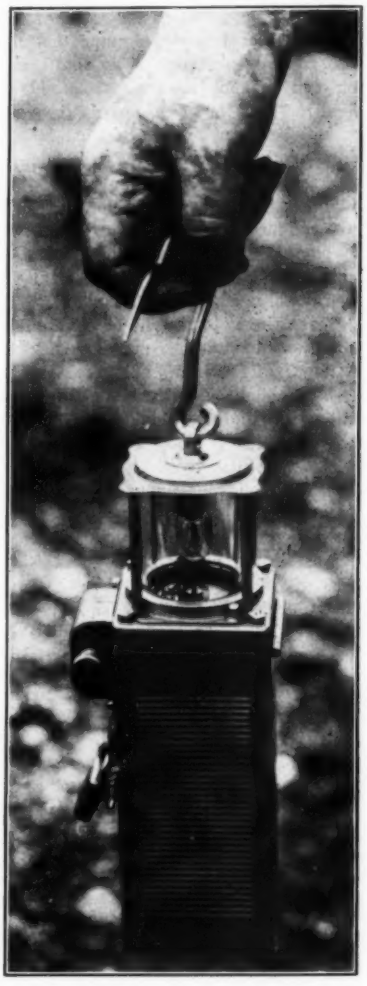
The paper elicited a long discussion, which was participated in by Messrs. Shepard, Vaughn, Lloyd, Cravath, Berry, Malia, Wheeler, Keane, Holladay and Green. The attendance at the meeting was 65.

Milwaukee Jovians Hold Rejuvenation.

A rejuvenation at which 24 new members were inducted into the Jovian Order, was held by the Milwaukee Jovians at the Hotel Republican on the evening of Thursday, January 16. The arrangements were under the direction of Statesman Meyers, and he was assisted by John C. Schmidtbauer, R. M. Van Vliet, C. J. Klein, and a number of enthusiastic Jovians from Chicago. At the subsequent Joviation, Sam A. Hobson presided, and short talks were given by Alternate Statesman Bowler, L. W. Burch, A. W. Clapp, R. M. Van Vliet, H. M. Stadtelbauer and A. A. Gray.

Edison Electric Safety Lamp.

One of the greatest drawbacks to the safe operation of mines has been the difficulty of providing the miner with an adequate source of illumination and at the same time protecting him from the dangers involved in the explosion of gases in contact with an unprotected source of illumination. From time to time inventors have sought to solve the problem by means of portable electric lamps of various designs, the electricity being supplied by primary or secondary batteries. The culmination of a long series of experiments and a deep research into the requirements of an electric safety lamp for mines is the Edison electric safety lamp, and for this contribution to safe operation in mines the great inventor has been awarded, through the medium of the American Museum of Safety, the Rathenau medal.



Edison Battery and Safety Lamp.

The Edison electric safety lamp combines the well known characteristics of the Edison nickel-iron storage battery with a specially designed steel container and lamp. The elements are nickel hydroxide

Edison Safety Electric Cap Lamp.

and iron oxide in a potash solution, held in a strong nickel-steel container hermetically sealed except at a miniature outlet for the escape of the harmless gases which are given off when the battery is being charged. The container and outlet are so constructed that even when the cell is violently shaken and inverted the solution may not escape. The gases given off on charge do not carry with them any substance to corrode the steel parts used throughout the construction of the lamp or the carrying case.

There are no insulation troubles in the Edison electric safety lamp, because when only two Edison cells are used in a battery, they may be placed together without any insulation whatever. In fact, the approved construction consists of grounding the positive terminal of one cell to its can, grounding the negative terminal of the other cell to its can, then connecting the two cans together electrically. The battery of two cells, thus connected, has an electromotive force of the combined electromotive forces of the two cells. The battery of two cells, thus connected, may be placed in a steel container without the introduction of any insulating walls.

The lantern cells are constructed in various sizes and capacities to conform to requirements of the various forms of lanterns and lamps. The positive and negatives plates are properly assembled and supported near the bottom of the steel container, the positive and negative terminals leading through gaskets in the top of the container. The vent tube, of peculiar design, is removable to permit of emptying the cell or replenishing the electrolyte with pure water. If the cell is inverted, the electrolyte is removed from the plates and no current can flow therefrom.

The terminals of the battery are provided with coiled-spring contacts which connect with nickeled-steel contact plates affixed to but insulated from the top of the case. There is no insulation between the cells nor between cells and steel case.

The battery case, of nickeled steel, secures the battery when the hinged top is brought down and a hasp on the side is brought over a staple. To further secure the top, a lock may be attached through the staple.

A twin-conductor flexible cord is provided, at one end, with a terminal which, when shoved into the socket on top of the battery case, becomes fastened thereto in such manner as to preclude the possibility of disconnecting it, until the lock on the side of the case has been removed and the lock-bar in the top withdrawn from articulation with the eye on the terminal. Therefore, it is impossible for the miner to cause a spark by disconnecting his wire in the mine.

The conductor is encased by flexible steel armor for considerable of its length, to serve as an anchor and prevent sharp bending. The other end of the cord is attached to the cap lamp, similarly anchored and protected against sharp bending.

The cap lamp consists of a parabolic reflector, provided with a flange, supporting a thick glass lens cushioned on gaskets; a tungsten lamp; a socket for supporting the lamp and reflector, and a hook to fit into the regulation cap.

Edison Safety Electric Lamp and Battery.

Method of Attaching Battery to Belt.

The reflector is designed to distribute the light over the proper area to permit of maximum practical illumination.

It is impossible for the miner to get into the reflector to tamper with the incandescent lamp, unless he disrupts a severable mechanical seal on the flange thereof. The lens is very thick to provide mechanical strength and of proper optical conformation.

The battery case is attached by a belt to the back of the miner, the flexible cord leading upward through a guide in back of the cap to a lamp attached to the leather support in the front of the cap. This arrangement leaves the arms free.

Annual Meeting of Consulting Engineers.

The annual meeting of the American Institute of Consulting Engineers was held on January 14, at the Engineers' Club, New York City.

Henry Holgate, of Montreal, Canada; Daniel E. Moran, of New York City, and Charles Sooysmith, of New York City, were elected members of Council to serve three years, and F. A. Molitor, of New York City, was elected a member of Council to serve one year.

After the routine business of the meeting was transacted, George F. Swain of Harvard University, addressed the meeting on the subject of "Education," which was ably discussed by Rudolph Hering, T. A. Bingham, Gardner S. Williams and Frank J. Sprague.

Commercial Vehicle Show in New York City.

The passenger cars exhibited at Madison Square Garden and the Grand Central Palace, New York City, last week, were replaced by commercial vehicles on Monday of this week, the exhibition to continue until Saturday night, January 25. There are on exhibition in Madison Square Garden about 150 trucks of various styles, and about 125 at the Grand Central Palace. All of the electric trucks are shown at the Palace.

At the same time, the exhibit of the National Machine Tool Builders' Association is being held in the basement of Madison Square Garden.

The largest single exhibit of electric trucks is in Space A-38, at the Grand Central Palace, and is from the works of the General Vehicle Company, Incorporated, of Long Island City. The company shows eight vehicles, representing five of its six styles, and claims that the superiority of electrics for city delivery is absolutely proven. This company announces that every fourth truck in New York is a G.-V. electric, and that it has machines over ten years old still in use in various lines of trade.

The Studebaker Corporation has entered the commercial-car field, and in addition to gasoline trucks, exhibits two electrically driven Studebaker types especially adapted to work on city pavements. This company's exhibit attracted considerable attention, and its electrically driven trucks received much favorable comment.

Among other electric-truck exhibitors were the following:

Atlantic Vehicle Company, one truck.

Baker Motor Vehicle Company, five trucks and delivery wagons.

General Motors Truck Company, several trucks and modern delivery wagons.

The Lansden Company, seven interesting electrics, four of them being delivery wagons, one ambulance, one emergency service wagon, and one express wagon.

The Ward Motor Vehicle Company exhibited four wagons.

The Waverly Company showed two trucks and a delivery wagon.

All the storage-battery companies continued the same headquarters as last as follows: Electric Storage Battery Company, Philadelphia, Pa.; Gould Storage Battery Company, New York City; Willard Storage Battery Company, Cleveland, O.; United States Light & Heating Company, New York City and Niagara Falls, N. Y.; Philadelphia Storage Battery Company, Philadelphia, Pa.

Other manufacturers of accessories of an electrical nature maintained headquarters during the present week the same as last week.

The belief seemed quite prevalent that electric trucks were becoming more and more recognized as the best suited for city service, and as a result of the special exploiting of this fact, it is believed there will be an increasing demand hereafter for electrically propelled commercial vehicles in all cities, both large and small.

The Importance of the Electric Truck in the Central-Station Business.

One of the most important papers presented at the meetings of the Electric Vehicle Association of America was read on Tuesday evening, January 21, at New York City, by H. W. Hillman. The paper was entitled "Relative Importance of the Electric Truck Compared with Other Classes of Central-Station Business." This paper presented figures showing the broad and extensive field the electric truck is sure to enjoy, and a table of comparisons with other current-consuming devices put the electric truck at the head as an income-getter, and incidentally showed that it made a small demand upon the plant equipment. Mr. Hillman, who is associated with the General Vehicle Company, gave to a degree the manufacturers' viewpoint of the situation and asked for more encouragement and co-operation from the central-station men.

Frank W. Smith, of the United Electric Light & Power Company, vice-president of the association, presided. Mr. Smith, with Messrs. Decker, Seelman, Johnston, Thomson and others, responded on behalf of the central-stations and asked for more data and more visits from the electric vehicle salesmen. Information that could be in turn handed to the prospective customer was very much desired by the central-station man.

Converse D. Marsh called attention to the development of the electric-truck industry, and said that the electric-truck manufacturers were operating at a good profit.

Harvey Robinson spoke of the strong support the New York Edison Company was giving the electric vehicle, and suggested that the manufacturers of this equipment send out more data relating to costs, running expenses and repairs.

An animated discussion was kept up for some time, and the information brought out was greatly appreciated.

Contract Power for Electric Railways.

A contract was closed on January 15 between the Commonwealth Edison Company and the Chicago Railways Company, under the terms of which the former will supply all of the electrical power used by the latter, which operates the surface car lines on the North and West sides of Chicago, comprising 462 miles of track. The yearly consumption is about 225,000,000 kilowatt-hours, costing approximately $778,000.

The Commonwealth Edison Company has for some time supplied most of the power used by the Chicago City Railway Company, which operates the surface cars on the South Side, and also a portion of the elevated lines. It is expected that eventually the Commonwealth Edison Company will supply all the power.

Secretary Fisher On Water-Power Development and Regulation.

The American Forestry Association has made public a speech, not heretofore published, that was made by Secretary of the Interior Fisher at a banquet during the convention of the association held recently at Washington, D. C. Dealing with the subject of "conservation," he declares it is to the interest of the country to urge and secure the adoption of a policy which will permit the natural resource of water power to be used as promptly and as fully as possible.

"The water power that we might harness and develop," he says, "is perpetual and continuous, and its use is the most living and vital example of conservation."

Mr. Fisher adds: "The reason why we have been able to accomplish so little is not the inherent difficulty of the situation, though it is not free from difficulty, but in my judgment—and I speak with full knowledge of the significance of my words—it is the obstacles which have been intentionally thrown in the way of that policy by people who believe that by so doing they will be able to discredit the movement which we represent and in which we are so vitally concerned."

He declares that at the recent water-power conference in Washington: "It then became publicly apparent that the power people are divided into two camps—on the one hand those who believe that the time has come when the power interests should recognize frankly the public interests involved in their business, and on the other hand those who still hope in some way or another to continue the old policy of unrestricted exploitation."

Mr. Fisher reviewed the recent grant to the Great Falls Power Company of Montana, whose interests, he says, "happen to be largely identical with those of the Amalgamated Copper Company and therefore it needs no argument to show that they were financially able to take care of themselves."

He says: "We proposed to prevent any possibility that by manipulation between two interests (the railroad and the power company) which might be, in some regard, identical, there should ever be an excess charge for the electricity purchased by the railroad company which would be a bar to effective rate regulation by the Interstate Commerce Commission," and he says that is why a provision was embodied in the grant prohibiting the power company from ever increasing the price of electricity.

Wisconsin Electrical Association.

Convention at Milwaukee, January 15 and 16.

The fifth annual convention of the Wisconsin Electrical Association was held at the Hotel Pfister, Milwaukee, Wis., on Wednesday and Thursday of last week. Four business sessions were held and these with the annual dinner left but little time free in the two days' gathering. From every point of view the convention was a very successful one. The total attendance was about 200. The interest taken in all the discussions was very keen.

The first session was opened at 9:35 a. m. on January 15 by President Irving P. Lord, of Waupaca. The first business was the presentation of the annual report of Secretary-Treasurer George Allison, of Milwaukee. In this he showed the Association to be in a flourishing condition both as regards membership and financial standing.

In accordance with custom, Mr. Lord then made the annual presidential address. He declared that the past year had been a prosperous one to the public utilities of Wisconsin. The Wisconsin Railroad Commission has done much to raise the standard of service of all the utilities and even of a number of municipal plants. The small companies are in much better condition than for some years. He referred to the pending session of the Wisconsin State Legislature, which will consider more or less new legislation bearing upon public utilities. He therefore urged the Association to co-operate with the members and committees of the Legislature in giving any information called for as a basis for such future legislation.

T. A. Pamperin, of Oconto, made a brief report for the Committee on Taxation. There has been lack of uniformity in the methods used for assessing public utilities in the state and some confusion has arisen in the interpretation of the income-tax law. Therefore a new bill is being drafted for presentation to the Legislature aiming to secure a uniform basis of assessment for utility taxation. A number of members, including P. H. Korst, C. C. Smith and Mr. Parker, discussed the subject of taxation. It was pointed out that the Wisconsin Tax Commission seems to have shown a tendency to raise the taxes of the utility companies, whereas the Wisconsin Railroad Commission, which controls the public-service business, is seeking to lower the service charges of the utilities, thus grinding the latter as between two opposing millstones. Mr. Pamperin said he felt confident that the two commissions will probably co-operate better in the future. George B. Wheeler, of Eau Claire, in discussing the subject further, said that the utility companies are all willing to pay their fair share of taxation but they are eager to have the taxes spread equitably on all parties. The Committee was ordered continued.

Operation and Maintenance of Arc Lamps.

A paper by L. H. Lathrop, general superintendent, Menominee & Marinette Light & Traction Company, entitled "The Proper Operation and Maintenance of Arc Lamps" was presented by the author. Mr. Lathrop reviewed the developments in arc lighting, discussing particularly the recent changes in street-lighting practice. The alternating-current series arc lamps have formed a very convenient unit, but these lamps have a tendency to pump and regulate poorly. Taking up metallic and carbon-flame arcs, he stated that the former have good light distribution and are quite efficient lamps. In connection with them, however, the need of mercury-arc rectifiers frequently proves a troublesome feature. Although the life of most rectifier tubes is quite satisfactory, occasionally very short-lived tubes are met with and their replacement causes an interruption in the circuit that it would be desirable to overcome. Old rectifier tubes can frequently be cleared by boiling in water for several hours; this seems to remove the mercury deposit upon the walls and gives them another lease of life. The amount of deposit collected on the globes of all flaming arcs seriously affects their light. These lamps should, therefore, be cleaned at every trim. Any company supplying street lighting by means of arc lamps should have an efficient maintenance and repair department. The arc lamps should be very closely adjusted for voltage and current before they are placed in service. The patrolmen employed to report outages should be compelled to make such reports promptly. In one city policemen make reports of outages that are given to the company in the morning and this gives an opportunity for inspection and any necessary readjustment of the lamp during the day. Arc-lamp trimmers should also be required to make a round of their districts in the evening to see that all the lamps are burning properly. Stocks of repair parts must always be kept on hand. The street series circuit should be run into the shop so that the lamps can be tested under service conditions. The shop should have a test panel to facilitate this work. Unreliable men in the arc-lamp department always prove a great financial loss to the company.

In reply to a question by W. B. Voth, of Sheboygan, Mr. Lathrop thought that it was not advisable to operate over 25 shunt lamps on one circuit, because any number in excess of this seems to cause poor operation and the lamps do not regulate so well. Respecting the number of arc lamps that one trimmer can maintain, Mr. Lathrop said that, if the lamps are new, more can be properly maintained than when they are in poor condition. He considered that one man can take care of 300 fairly new luminous arc lamps without overexerting himself. F. A. Vaughn, of Milwaukee, closed the discussion by describing the extensive use of carbon-flame arc lamps in Chicago.

Standards of Service.

J. N. Cadby, of the engineering staff of the Railroad Commission of Wisconsin, presented a paper entitled "The Proposed Revision of Standards of Electric Service Now Under Consideration by the Railroad Commission of Wisconsin." The public now demands prompt and high-grade service. In connection with all service an excellent rule is "safety first"; this has been the means of reducing accidents very materially. The frequency of accidents from live guy wires has led to new rules on this subject. Mr. Cadby then referred to the rules of the Wisconsin Commission in which standards of service had been defined shortly after the creation of the Commission in 1908. It has been felt that many of these rules require revision. Therefore a tentative draft of these revisions was presented by Mr. Cadby, and the various rules therein discussed. It is proposed to hold a public hearing soon to discuss these revisions of the standards of both electric and gas service. In all these revisions the idea is not to reduce the quality of service nor to suddenly raise the standard to too high a level. Most of the revised rules deal with the testing of meters, defining how the tests should be made, how frequently and under what conditions inspectors of the Commission will make tests on complaint of consumers. A rule respecting the inspection of incandescent lamps in the premises of each consumer requires this at least once every two years, and urges the company to render the consumers reasonable assistance in securing incandescent lamps best adapted to the service furnished. Commutator-type meters are required to be tested more frequently than those of the induction type.

In the case of small companies the meter tests do not have to be so frequent as in the case of large utility corporations. Respecting the testing of maximum-demand meters the same degree of accuracy is required for these instruments as for integrating watt-hour meters.

The discussion on this subject was opened by F. A. Vaughn, Milwaukee. He urged the co-operation of the Association and central-station companies with the work along this line that had already been done by other organizations, notably the National Electric Light Association and the Association of Edison Illuminating Companies. He spoke at some length of the work of the Meter Committee of the former association which had been carried on for a very long time and resulted in the production of the Meterman's Handbook, a pocket reference book of some 1,200 pages. As a representative of that committee he discussed in some detail the various modifications that were proposed in the Wisconsin standards, taking up particularly the testing of meters. He urged a more explicit definition of the requirements for inspection of incandescent-lamp installations. Personally he felt that it would be extremely valuable to do this, if it could be properly carried out. He felt that there was great need for educational work amongst the customers of all central stations along the line of improving illumination. Probably a good way to stimulate interest in the matter would be by the sending out of the Illumination Primer that had been prepared last year by the Illuminating Engineering Society.

In reply to a question by Mr. Wheeler, Mr. Cadby said that some companies are making their suggestions in regard to proper lamps by placing stickers on lamps that have blackened very decidedly. In many cases the meter testers make the lamp inspection. The Commission's idea in this regulation was not to make burdensome requirements but to improve the lighting service. Where a company does not make lamp renewals it should at least supervise the stock of local dealers and others who supply the lamp trade in order to see that lamps of proper voltage are furnished.

W. H. Winslow, of Superior, questioned whether it would be advisable for a company to make compulsory inspections of the lamp equipment, as many customers would object thereto. He thought perhaps it would be preferable for the company to offer its services in this connection and not to make the inspection mandatory. Therefore, he thought it would be better to change the rule so that the inspection would be made at the request, or at least with the consent, of the customer.

M. C. Ewing, of Wausau, felt that the requirement of periodic inspection was a very important and valuable one because the tendency is becoming more pronounced of giving service and not merely selling current. Therefore, he thought it extremely desirable to make suggestions to consumers for improving the illumination of their premises. The inspectors employed for this should have a fair knowledge of illuminating engineering. He thought, moreover, that such inspections were valuable not only for improvement of illumination but also for improvement in the use of power.

T. A. Pamperin, of Oconto, thought that the smaller companies could hardly afford to engage illuminating engineers to make the inspection required. Moreover, he said the general use of tungsten lamps does not require the replacement of lamps due to blackening nearly as frequently as with the old carbon lamps. Therefore, he thought that the matter will probably take care of itself.

P. H. Korst, Janesville, agreed that the matter will probably take care of itself on account of the improved service from tungsten lamps, and he also felt that, if an inspection is required of lighting, why should it not be required of heating and power load and of gas and water service? Respecting the testing of meters by the Commission's inspectors on complaint of the customer he thought the central-station company should be given an opportunity to test the meter and to correct any errors before the complaint is made to the Commission.

The discussion was closed by Mr. Cadby, who stated that those consumers who make complaint of inaccuracy of meters are not numerous at any rate and undoubtedly would prefer to deal directly with the Commission, because the very fact that they are making complaint shows that they have no confidence in the inspectors of the central-station company. Regarding the requirement for periodic inspection of incandescent lamps, this had become practically imperative because of the very poor condition of affairs noticed in very many installations. Some companies have carried out such inspection very satisfactorily through their new-business solicitors, since these can usually make suggestions for the improvement of the lighting conditions and at the same time urge the customer to make use of other appliances, such as heating devices, washing machines, etc.

The Milwaukee Fare Case.

The second session of the convention opened at two o'clock on Wednesday, when Edwin S. Mack, of the law firm of Miller, Mack & Fairchild, made an address entitled "The Decision in the Milwaukee Fare Case." In order to understand the conditions that led up to this case, Mr. Mack briefly reviewed the history of the Milwaukee street-railway system and showed how the consolidation of a number of competing railway lines into one unified system had been carried out. In a preceding case which had been brought in the United States courts a decision rendered by Judge Seaman was a very important one, being frequently cited in questions involving fares. The recent case brought before the Wisconsin Railroad Commission brought about a very carefuly study by the Commission of the Milwaukee property. Mr. Mack described the manner in which the valuation of the property had been made and discussed the differences in the totals arrived at by the company and by the Commission. A point involved in the controversy was the proper division of capital and income accounts of a company supplying several classes of service. With the Milwaukee Electric Railway & Light Company it had been the custom to figure 80 per cent of the totals for the street-railway system and 20 per cent for the light and power division. The Commission's decision shows that for any company giving combined service it is important to make a division of capital and income accounts in order to make a fair division of the total income at any time, so that the rates to be charged for each class of service can be equitably determined. In the case of small companies it may not be practicable to carry out continual divided accounting for the different classes of service; however, the aim can be accomplished quite satisfactorily by making a close study and analysis of the income at stated times so as to arrive at a fair percentage division of the incomes which may be used for a considerable period. An important point in the case is that in any consolidation of companies the exact basis of physical and other values of the different properties on which the purchase price is paid must be clearly known and it must be possible to set this forth at any time in case of future litigation. In practically all cases the values are now made on the basis of the reproduction value new. The decision in the Milwaukee case applied not only to the urban but also to some of the suburban railway lines. It was decided that the fare limits be extended on some of the lines and that 13 tickets be sold for 50 cents instead of 6 for 25 cents. The Commission passed this final decision on its conviction that the company could still make 7.5 per cent on its investment, even after making these slight reductions in the rates of fare.

In discussion of the subject several speakers felt that an allowance of 7.5 per cent on the investment was going to hamper development of the industry. Mr. Mack agreed in this and thought that it probably would have a tendency to delay the extension of lines and the building of new systems. However, the Commission had not prevented the company from earning more than 7.5 per cent. In some undeveloped parts of the state doubtless the Commission would feel that a larger

minimum return would be entirely justifiable.

Liability Insurance.

The report of the Committee on Liability Insurance was presented by its chairman, Ernest Gonzenbach, of Sheboygan. This committee was appointed to consider a plan of mutual workmen's benefit insurance for the electric utilities of Wisconsin. The matter had been brought up by the passage of a workmen's compensation law, directly after which the old stock liability companies had suddenly raised their rates to what seemed exorbitant figures. The Committee gave some of these rates and after a discussion of the subject proposed three plans for the formation of either a mutual insurance company by the members of the Association, for the joining with a mutual or co-operative liability company of good standing which makes a business of writing liability insurance of electric utility companies, or of insurance in a mutual company organized by Wisconsin employers under the provisions of the workmen's compensation law.

The discussion was opened by P. H. Korst, who said that the old line stock companies now accepted public liability insurance, even when a company does not insure its employees. Dr. Fricke, representing the Wisconsin Employers' Mutual Liability Insurance Company, of Wausau, then made an address, in which he reviewed the history of workmen's compensation, explaining particularly its development in Germany. He said that mutual companies are the only ones that are effective in carrying out the spirit of the law.

The further discussion of this matter was deferred until Thursday morning. In the meantime the Committee had retired for further consideration of the subject, during which the arguments of a number of insurance representatives were given a hearing. At the Thursday morning session the Committee submitted a supplementary report, in which it briefly summarized the result of its further deliberations, and recommended that the members of the Wisconsin Electrical Association take up the proposition made by the Wausau company to insure the employees and also under certain conditions insure the public against liability. A protracted discussion of the subject followed in which Ernest Gonzenbach, W. H. Winslow, G. B. Wheeler, I. P. Lord, M. C. Ewing, L. T. Block, T. A. Pamperin and P. H. Korst participated. The report of the Committee was finally adopted.

A paper entitled "A Work Order System Adaptable to Public Utilities: Its Purpose and Method of Application," was presented by George W. Kalweit, auditor of the Milwaukee Electric Railway & Light Company. By means of lantern slides Mr. Kalweit showed how the four different groups of accounts for the railway, light, heat and gas departments were segregated and classified. The company makes use of a very highly developed and detailed system of work orders, which Mr. Kalweit explained. The distribution of charges is always according to the classification of accounts in vogue. The paper was briefly discussed by George Allison, of Milwaukee.

Dispatching and Training of Car Crews.

A paper entitled "Dispatching and Handling of Street Cars and Training of Crews" was presented by Edward Hammett, superintendent of the railway department, Sheboygan Railway & Electric Company. This paper dealt first with the training and disciplining of car and train crews. The training of men is a very important matter. It is desirable to weed out shiftless men as early as possible and to employ only such men as will remain in the service permanently. Most accidents have been traced to the new men on the cars. In order to minimize breakdown of cars in service the inspectors of car equipment are given bonuses to make their work thorough. The merit system is employed to discipline the men. At first difficulty was experienced in this connection, but now it is working very satisfactorily. A benefit association has been organized among the employees to which both the men and the company contribute. This association also aids the social welfare of the men by giving picnics and dances occasionally, the proceeds of which go toward the funds of the association. The men are now convinced that the company is looking out for the welfare of its employees. The result is that the standard of service has been very materially raised and an admirable *esprit de corps* developed. Regarding the dispatching of street cars and interurban trains, Mr. Hammett said that the schedules must be based on an analysis of the recipts on different divisions. He described in detail the methods used for making up time tables and showed by means of a graphic diagram how the dispatching of interurban cars can be very successfully arranged for. He also described the train orders in use. The Railroad Commission of Wisconsin has under consideration the adoption of a uniform system of dispatching for interurban electric railways. Mr. Hammett therefore suggested that a committee be appointed to discuss the subject and make recommendations to the Commission. On motion this committee was ordered appointed.

The paper was discussed by J. C. Justesen, of Wausau, who spoke of the conditions in his city and emphatically declared that the matter of training employees must be very carefully done. The men must be given decent pay and decent treatment or the service will suffer and in some cases even dishonesty will result; he cited instances to verify these conclusions. Others who discussed this subject were L. H. Lathrop and Mr. Hammett.

Standardizing Laboratory of the University of Wisconsin.

On Thursday morning at 10 o'clock the third session was opened by the presentation of a paper entitled "The Standardizing Laboratory of the University of Wisconsin," by F. A. Kartak, electrical engineer of the University. This laboratory has been of service heretofore for standardizing the instruments used for testing purposes by the engineering staff and inspectors of the Wisconsin Railroad Commission. It has now been decided to utilize the laboratory for commercial testing as well and this service has been particularly placed at the disposal of central-station and utility companies in the state. Mr. Kartak described the laboratory equipment, referring particularly to the precision standards maintained there, all of which are derived from the standards maintained by the Bureau of Standards, Washington, D. C. A number of auxiliary primary standards are maintained and high-precision potentiometers are available for calibration work of secondary standards. Among the secondary standards are voltmeters, ammeters and wattmeters that are actually used for the instrument calibrations. The photometric laboratory has five rooms with four photometers and a number of Bureau of Standards lamps. Mr. Kartak described the details of testing and explained how the high degree of accuracy is maintained. The commercial testing to be done will be for the calibration of direct-current and alternating-current instruments and lamps, all of which will be certified. The fees for this service will be only nominal. Instrument adjustments will be made at cost, if desired, but no general repair work on instruments will be undertaken.

In the discussion Mr. Bradshaw emphasized the need of a good packing box for shipping meters to the laboratory and back to the companies. The experience of the Westinghouse Electric & Manufacturing Company in the matter of calibrating instruments was described by him. In reply to a question by Mr. Voth, Mr. Bradshaw said that working rotating standards should be tested against the laboratory standard meter every day if possible, or at least as frequently as can be done. Many companies make a daily test check of the portable instruments used by their inspectors. If a rotating standard meter is not abused its calibration will not have to be changed for perhaps five years or more. A maintained accuracy within one per cent is entirely feasible.

W. H. Winslow asked whether it would not be desirable to keep one rotating standard as a check and the other one

for portable work. Mr. Kartak thought this would be a good idea for the smaller companies. Mr. Bradshaw said that this is a good practice, provided that the stationary meter used as a standard is used every day, to prevent the accumulation of dust in the jewel bearings. For this stationary standard meter it is not necessary to use a rotating standard, because a regular service meter can serve just as well.

At this point President Lord appointed a committee consisting of O. M. Rau, C. N. Duffy and H. P. Andrae to consider the feasibility of holding an electrical show in Milwaukee next year.

A paper entitled "Building up a Day Load for a Small Central Station" was presented by W. E. Haseltine, manager of the Ripon Light & Water Company. This paper is published in full on other pages of this issue.

Mr. Irwin, of Berlin, which is an industrial town of about 4,600, gave the result of providing 24-hour service in his community. A day service has been given for nearly seven years with very satisfactory results. The growth of power load has been about 100 horsepower per year in the last four years. The revenue from lighting customers has increased about $150 a month as compared with the preceding year. Power is supplied to a number of quarries, glove factories and other industries. Until last year but very little solicitation was done. The connected power load is about 2,200 horsepower. Power rates are from two cents per kilowatt-hour upwards. The central station also has a heating load. The paper was also discussed by Ernest Gonzenbach, P. H. Korst and others.

Resuscitation from Electric Shock.

The closing session of the convention on Thursday afternoon was opened at two o'clock by Dr. Charles H. Lemon, chief surgeon of the Milwaukee Electric Railway & Light Company, who made an address on "Resuscitation from Electric Shock and First Aid to the Injured." Dr. Lemon spoke at first of the work which had been done by the Resuscitation Committee of the National Electric Light Association in conjunction with other organizations. There are two theories as to the manner in which death is brought about from electric shock. One is that the auricles of the heart are thrown out of rhythm into a condition known as fibrillation in which they vibrate at a frequency as high as 300 times a minute. The second theory is that the lungs become agglutinated and that the blood becomes electrolized. Death is not always due to high-voltage shocks necessarily, because some cases are on record where death has occurred from a shock of as low as 100 volts. On the other hand, a case in which a man was shocked on a 13,200-volt line was narrated by Dr. Lemon as having occurred only on the preceding day. The man was immediately taken in hand by his fellow employees, who began artificial respiration and after working on him for some time he was revived; on account of the severe burns to his limbs he had to be removed to the hospital, however, but with every prospect of complete recovery. It is important that artificial respiration be begun as soon as possible. At any rate air must be supplied to the lungs within 10 minutes after receiving the electric charge or else death is almost sure to result. Dr. Lemon said that the old method for artificial respiration is not found to be reliable and the modern prone method is now considered the only one satisfactory. By the aid of an assistant he gave a demonstration of the prone method and also showed how the pulmotor is employed in cases of this kind and also in cases of asphyxiation by gas.

President-Elect William H. Winslow.

Mr. Winslow was born in 1867 in Chicago, where he received a public school and business education. In 1889 he went to Superior, Wis., and became associated with the Superior Water, Light & Power Company, just as the company was formed, retaining his connection therewith continuously ever since. First he was its cashier, later secretary, then manager, and a few years ago he rose to the position of vice-president and general manager, which he holds now. The company is a combined utility, furnishing water, gas, electric light and power service. Mr. Winslow is a member of the American Waterworks Association, National Electric Light Association, Illuminating Engineering Society, Wisconsin Electrical Association and Wisconsin Gas Association. He was president of the latter for the year 1910-1911. He is also a member of the N. E. L. A. Rate Research Committee and an occasional contributor to the technical press.

Election of Officers.

G. B. Wheeler reported for the Committee on Nominations and on motion the nominees for officers for the ensuing year were unanimously elected as follows: President, W. H. Winslow, vice-president and general manager, Superior Water, Light & Power Company; first vice-president, William Wallen, manager, Oshkosh Gas Light Company; second vice-president, P. H. Korst, general manager, Janesville Electric Company; third vice-president, M. C. Ewing, manager, Wausau Street Railroad Co.; secretary-treasurer, George Allison, comptroller for Clement C. Smith, Milwaukee. President-elect Winslow made a brief address.

A resolution was passed that the secretary-treasurer be recompensed to the extent of $300 for his expenses during the past year. An amendment to the by-laws was proposed calling for the appointment of a legislative committee. This was referred to the Executive Committee, which reported later in the session that this committee be named Advisory Committee and that it should consist of the president and four members; it was so ordered. On motion of Mr. Ewing it was decided, in order to give more time to discussion, to recommend to the Executive Committee that the 1914 convention be held as a three-day meeting, if the committee finds this to be expedient.

Overhead Distribution Systems.

The last paper of the convention was that presented by C. R. Phenicie, general superintendent, Wisconsin Public Service Company, Green Bay, Wis. This paper is entitled "Construction and Maintenance Problems of the Overhead Distribution System of an Electric Utility," and was a strong plea throughout for high-class construction. Mr. Phenicie pointed out that such construction means low maintenance, whereas poor construction means high maintenance. In determining upon the building of a new line or an extension three considerations must be kept in view: first, the commercial practicability of the line; second, the probable growth of the new territory; third, the attitude of frontage owners. Having determined on an extension the type of construction actually used should be the best possible in view of all of the preceding considerations. Mr. Phenicie referred to the report of the Joint Committee on Overhead Line Construction of the National Electric Light Association, which is a standard of construction and should be followed wherever possible. Taking up some of the details, he said that the different classes of circuits should be kept entirely separate, if possible on separate cross-arms, and should always bear the same relation to each other, as this decreases the liability for accidents to linemen. He discussed many details that must be looked out for in order to have a strong and safe line. He emphasized the value of neat and straight lines, as such lines are not required to be replaced by underground circuits as soon as carelessly and poorly maintained lines. He was confident that the clamor for underground construction was due in many

cases to the poor manner in which the overhead equipment had been put up and maintained. He suggested that the lines be carefully gone over every two years to take out the sag. It is desirable to repaint the poles every two or three years. Poles which are to be climbed very frequently should have steps to keep them from being marred. Pole preservatives should be used wherever it is practicable to do so. It is desirable to have adequate inspection of lines clearly defined. Therefore, he recommended that a committee be appointed to consider this.

The discussion on the paper was opened by R. M. Howard, of Winona, who described an instance of haphazard construction that resulted from having competing companies in the same town, each of them trying to put up their overhead lines at minimum expense. The result was that underground construction was ordered very much earlier than would have been the case if the lines had not been neglected. Another result was a very serious accident.

W. H. Winslow referred to a recent case that came up in Superior respecting the extension of lines. The company had adopted the policy that it would extend the lines without extra charge, if the cost of the extension was less than $30 per customer to be connected. It is necessary to have some requirement of this kind in order to have a reasonable profit on the extensions of lines into sparsely settled districts. The paper was also discussed by W. E. Haseltine, W. R. Schmidley, Clement C. Smith and others. On motion of Mr. Smith it was decided to appoint a committee of three to consider a standard of inspection of overhead lines.

On motion of Mr. Pamperin it was decided to discharge the Tax Committee from further duties and to transfer its work to the newly authorized Advisory Committee. On motion of G. B. Wheeler the Executive Committee was authorized to publish such of the convention proceedings, aside from the two papers already ordered, as it deemed desirable. Resolutions of gratitude for the efficient services rendered by the president and other officers of the Association were passed and the convention then adjourned.

Banquet.

The important entertainment feature of the convention as usual was the annual Association banquet, which was held on Wednesday evening in the Fern Room of the hotel. Nearly 200 persons, of whom a considerable number were ladies, enjoyed the excellent dinner and postprandial program.

C. N. Duffy, of Milwaukee, occupied his customary place as toastmaster. Mayor Gerhard A. Bading of the City of Milwaukee made an address of welcome. President Irving P. Lord spoke of the relations of the public utilities and the public. He said he preferred the term "public service corporation" instead of "public utility," because the first duty of such an organization is to serve the public, the second duty is toward its stockholders and the third is toward its officers. In former times the order of these duties was exactly reversed. Fortunately, however, the old corporation spirit is now entirely dead. The public is now a critical body. The old animosity toward public service corporations has been inflamed by demagogues and politicians, and a charitable feeling on each side is absolutely needed.

H. J. Desmond, of Milwaukee, made a very humorous and optimistic address. Charles L. Benjamin, of the Cutler-Hammer Manufacturing Company, spoke of public-utility advertising. He defined advertising as the art of disseminating information to influence the will of a specific class of persons, and showed that while all advertising is publicity, publicity is not always advertising. Many classes of advertising not commonly recognized as such are some of the very oldest, such as by demonstration, by oral efforts, by correspondence and through the testimony of disinterested persons, all of which are advertising without appeal through the press or periodicals. The advertising of public utilities is very different from that of manufacturers. In the first place all the advertising must overcome inertia and ignorance. It must educate the public on the needs of the utility business, not only in order to sell more current but to get the public's good will.

Herbert N. Laflin, counsel of the Northwestern Life Insurance Company, made an address in which he urged an idealistic view of life. George B. Wheeler spoke briefly of the benefits of the Wisconsin Electrical Association to its members and to the industry at large and dwelt on its influence and increasing strength. August E. Stadlbauer, of Julius Andrae & Sons Company, Milwaukee, made a humorous but short address on behalf of the supply interests. Sam A. Hobson closed the proceedings by speaking on the value of cooperation.

Exhibits.

As customary, a series of exhibits was made by various manufacturers and supply interests. In this connection, the Wisconsin Electrical Exhibitors' Association held a brief session, in which its organization was renewed for another year. Exhibits were made by the following companies:

General Electric Company, Schenectady, N. Y.; heating appliances, ozonator, repulsion motor, flame arcs.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.; a large variety of heating appliances.

Electric Appliance Company, Chicago; Sangamo meters, Guarantee iron, Delta-Star combined outdoor choke coil, horn-gap arrester, fuse and disconnecting switch.

Edison Phonograph Company; cabinet-type phonograph.

Illinois Electric Company, Chicago; Bierce anchor, Dunham cigar lighter, Copper-clad wires, Paragon lamp bracket and specialties.

Julius Andrae & Sons Company, Milwaukee; Mazda lamps, Blackstone electric washer, large assortment of heating devices and specialties.

Crouse-Hinds Company, Chicago, condulets, switches, panel-board, luminous arc leadlights.

Ajax Sales Company, Grand Rapids, Mich.; Ajax electric plug drill and riveter.

Central Electric Company, Chicago; Alexalite fixtures, Patterson battery set, window reflectors, heating devices, Hart remote-control switch.

Charles Polacheck & Brothers Company, Milwaukee; lighting fixtures.

C. J. Litscher Electric Company, Milwaukee; Universal heating devices.

The following firms, although making no exhibits, maintained headquarters: Allis Chalmers Company, Milwaukee; Fort Wayne Electric Works, Fort Wayne, Ind.; Utilities Indemnity Exchange, St. Louis, Mo.

Aside from the display of commercial products a very interesting exhibit was made jointly by the Wisconsin Railroad Commission and the Standardizing Laboratory of the University of Wisconsin. Included in this were a complete photometer bench outfit and a street illuminometer; graphic recording wattmeters and voltmeters; complete calibrating equipment with potentiometer and rotating standard meters for testing indicating instruments and watt-hour meters; also many maps, charts, diagrams and other graphic displays, showing conditions met with by the Commission's inspectors. A number of representatives of the Commission and of the Laboratory were present to explain the inspection work of the Commission and the calibrating work of the University Laboratory.

A Notable Central-Station Picture.

As a supplement to the *Edison Monthly* for January, the New York Edison Company has published a photogravure in colors of the Waterside stations, East River, Thirty-eighth and Fortieth Streets, from the painting by Guy Wiggins.

The *Edison Monthly* has been a source of intense interest and great satisfaction to those artistically inclined, due to the careful selection of illustrations and the choice in each issue of some reproduction of a classical drawing or painting depicting some famous landscape or other setting.

New Electrical and Mechanical Appliances

Westinghouse Automobile Starting, Lighting and Ignition Systems.

The Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has entered the automobile accessories market with electric starting, lighting and ignition outfits. These sets were exhibited at the New York Automobile Shows and will be shown at the Chicago Show. Contracts have already been made with a number of high-class-car manufacturers.

The equipments so far announced are starting motors, lighting generators, combined ignition and lighting generators, and combined starting and lighting motor-generators; all of these are six-volt systems. None of the systems require many parts.

For starting and lighting, one motor-generator is used, and for ignition and lighting, one generator and one ignition coil. All timing and distributing parts are contained in the generator. This simplifies both the electrical and the mechanical connections.

A feature of the Westinghouse motors and generators of this class is the heat-resisting compound in which all windings are baked. This compound cements the windings together and prevents them vibrating and jarring loose, and the compound will not soften even at 250 degrees Fahrenheit. Oil, gasoline, water and alcohol are said to have no effect upon this compound.

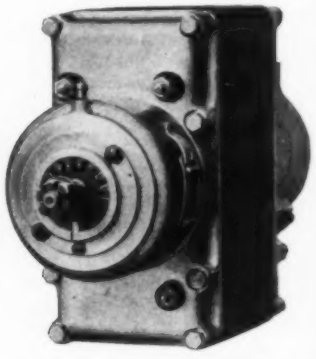
The generators operate in connection with a storage battery. The battery furnishes power when the engine is running at low speeds and when the car is idle. By an arrangement of the generator winding, the battery is charged at all running speeds when lights are not burning, and when the lights are burning the generator supplies the current for the lights and in addition charges the battery above the balancing speed. The arrangement is such that the battery is at no time charged at an excessive rate, whether lights are burning or not. This regulation of battery charging is accomplished by the generator itself, and without the use of any relays or solenoid-operated regulators. The system is self-regulating and no adjustments are necessary. The generators have wound fields and no so-called permanent magnets to deteriorate with age.

Ignition is accomplished through a high-power single-unit spark coil, operating in conjunction with timing and distributing parts on the generator. The battery, either alone or acting with the generator furnishes continuous power for this purpose. The timer or interrupter gives automatic spark advance and also increases the period of contact as the speed increases, to make the spark uniform regardless of speed.

The Westinghouse starting motors are designed with a view to minimizing the discharge of the battery during starting. This is done by so nicely adapting the power of the motor to the requirements that it turns the engine over as one would do in cranking by hand. This takes considerably less power than would be required to spin the engine unnecessarily at high speed, and enables the use of a lighter battery and a lighter charging generator because of less capacity for charging.

The motors and generators have ball bearings and steel shafts and frames. They are entirely inclosed, and thus are dust and liquid-proof. Their lightness is the result of the compact arrangement and skillful design of the parts. Starting, lighting and ignition switches, meters and wiring details are furnished with standard equipments.

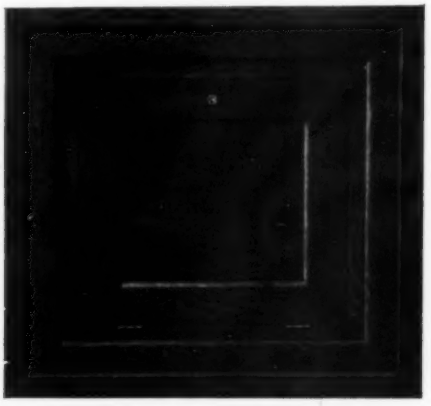
Starting Motor Complete.



Starting and Lighting Motor-Generator.

Columbia Steel Cabinets With Wood Finish.

The use of steel cabinets for panelboards, cutout cabinets and wall switchboards is gaining deserved popularity. As a rule, these cabinets should not be accessible except to authorized parties, such as the house electrician, foremen or superintendents; the doors on steel cabinets cannot readily be pried open nor the fuses and switches tampered with. The absence of inflammable material makes the steel cabinet absolutely fireproof.



Columbia Wood-Finish Steel Cabinet.

These and other advantages have led the Columbia Metal Box Company, 226 East 144th Street, New York City, to place on the market a very complete line of sheet-steel cutout cabinets, panelboards, push-button and knife-switch cabinets. These are made in a great variety of shapes, sizes and finishes to make them suitable for various classes of service. The material varies in thickness from 1-16 to 3-16 inches, depending on the size of the cabinet; the sizes run from four and one-half by five inches up indefinitely. Recently there was built by the company a cabinet that weighed over 2,000 pounds and was made of three-sixteenths-inch steel. All of the Columbia cabinets

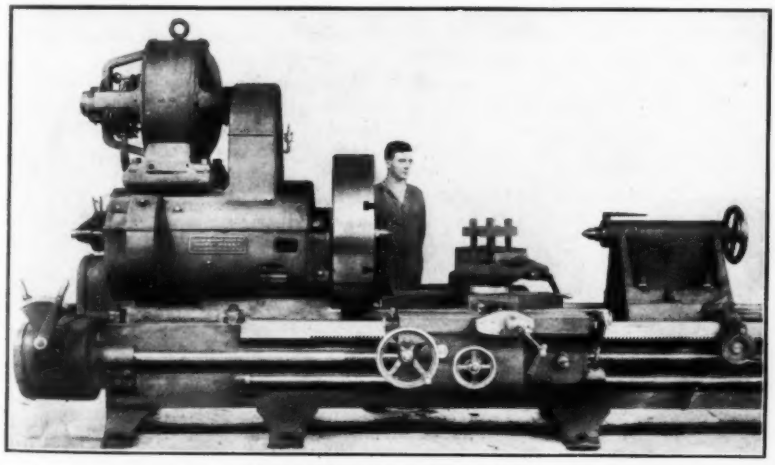
or switch boxes are seamless, the joints being electrically welded by a welding machine designed and built by the company for this special work. This is said to be the only electric welder of this design in use.

A unique type of these cabinets is that known as type S W, which signifies "steel wood." As shown herewith, this type of cabinet is composed of a plain steel box and highly finished steel trim and door. This finish is an extraordinarily good imitation of any natural wood finish and can thus be made to harmonize with the wood trim and finish of corridors or rooms where the cabinet is installed. The wood effect is produced not by hand graining but by a special photographic process that produces a very natural appearance. The trim stands out three-fourths of an inch and is finished on the side as well as front, so as to give the complete effect of a wood trim. Any shade and kind of wood can be successfully imitated.

This type of steel-wood cabinet is used in the New York public-school buildings, in which the finish is made to resemble quarter-sawed oak and gives the cabinets a very handsome appearance. The boxes have knockout holes for half-inch conduit evenly spaced on all the sides.

Lathe for Turning Projectiles.

The motor-driven lathe illustrated herewith is used for turning projectiles. This service requires rigidity of equipment and wide speed range, since



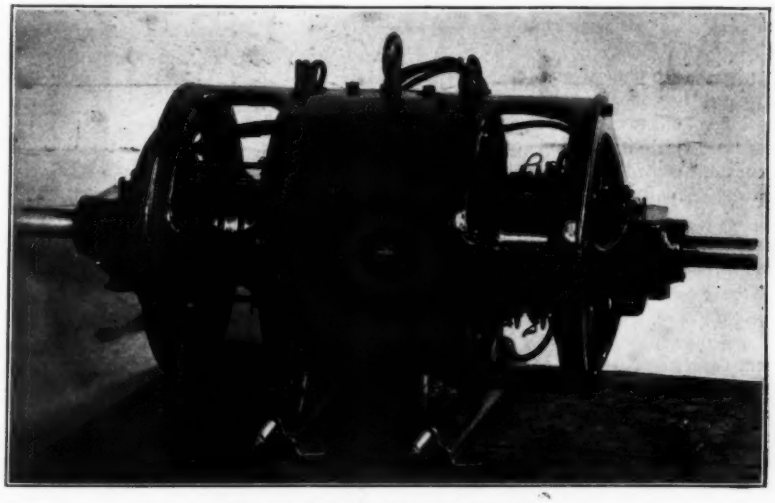
Motor-Driven Projectile Lathe.

a very high spindle speed is necessary when finishing the point of the projectile. The lathe, which is of Pond make, is especially designed for individual-motor drive and is not a belt-driven lathe modified for motor drive. The motor is placed on the lathe head, thus saving floor space and doing away with any chance of injury to employees from coming in contact with the motor or gears; at the same time the motor is protected from harm. The control handle, it will be noticed, is to the extreme right of the tool apron and very convenient for the operator.

The lathe is driven by a Westinghouse 20 horsepower machine-tool motor, with speed ranging from 400 to 1,500 revolutions per minute. Commutating poles insure excellent commutation at all loads within its capacity. With the liberal speed adjustment of the motor, in combination with the gear-changing device operated by means of the levers shown at the left end of the tool, the wide adjustments needed in turning up projectiles are made readily available.

Novel Convertible Machine for Laboratory.

The Diehl Manufacturing Company, Elizabethport, N. J., has developed an interpole inverted converter with special characteristics which commend it for use in laboratories. The machine will develop single-phase or three-phase alternating current, 60 cycles, may be run as a shunt or compound direct-current generator, or shunt or compound direct-current motor of the commutating-pole type.



General-Utility Laboratory Machine.

The machine is designed to operate as a motor from the direct-current end, having a capacity of 10 horsepower on a 220-volt circuit. When operating in this way the machine develops alternating current at 155 volts single-phase, 60 cycles, from two rings on the alternating-current end or three-phase, 60-cycle current from additional rings. When operating as a rotary converter the machine is shunt-connected.

For further testing purposes the machine is equipped with a compound winding on the fields so that it may be operated as a compound direct-current generator. When operating as a direct-current generator at a speed of approximately 2,200 revolutions per minute the machine is flat-compounded from no load to 50 per cent overload.

This machine can also be utilized as a shunt-wound interpole motor and the flat speed regulation, high efficiency and other characteristics of this type of apparatus make it particularly serviceable for laboratory testing.

The machine is equipped with shaft extensions on both ends in order that it can be installed in a particular position and pulley arrangements made for its operation either as a direct-current motor or a belt-driven generator. If the machine is brought up to speed from the direct-current end it can be thrown in on a three-phase line to operate as an alternating-current motor or as a straight converter.

The apparatus is small, compact, and constructed with cast-steel frame, laminated main poles, and wrought-iron commutating poles.

A New Electric Tachometer or Speed Indicator.

The Brown Instrument Company and the Keystone Electrical Instrument Company, of Philadelphia, Pa., are placing on the market a new electric tachometer or speed indicator to accurately indicate or record on a chart the revolutions per minute of a rotating shaft or wheel.

There are many operations where an accurate speed indicator is desired to be permanently connected to an engine or machine, and to show at a glance the speed at which it is running, or to keep a constant record of this speed on a chart for the whole 24 hours.

The electric tachometer has the advantage of not only being exceedingly accurate, but that the indicating or recording instrument can be located at any desired distance from the shaft, the speed of which is to be measured. The instrument consists of a small magneto or generator, specially designed for use with this tachometer and which generates 25 volts at 1,000 revolutions per minute. On account of the voltage generated, an instrument absolutely dead beat in operation can be supplied. The instruments have been particularly designed by the above companies of unusually high resistance exceeding 3,000 ohms in each instrument, so that the length of leads connecting the magneto or generator and the indicating instrument have no effect on the readings, and also one, two or three instruments can be connected to the same generator without affecting the indications. This high-resistance feature is exceedingly advantageous, for oftentimes after the generator and one indicating instrument have been installed, it is desirable to place a recording instrument in the office, or at another convenient point, and this can be connected to the generator without recalibration of the instrument.

Fig. 1.—Electric Speed-Indicating Outfit.

In Fig. 1 is shown the standard Brown electric tachometer, consisting of generator, leads and indicating instrument as usually supplied, while in Fig. 2 is shown a group of instruments connected to a generator driven by sprocket and chain, two indicating instruments and one recording instrument being connected to the same generator to both indicate and record the speed at three different points.

With many machines it is desirable to operate at a certain speed to produce the best results as, for instance, in large machine tools it is desirable to know the cutting speed, and by use of this electric tachometer mounted beside the machine the exact speed can be noted at all times.

At all blast-furnace plants where gas or steam blowing engines are in use it is necessary to run thes engines at a constant speed so that a certain number of cubic feet of air per minute can be blown into the furnace. The revolutions per minute in cases such as this are of exceedingly great importance, and with the Brown electric tachometer with one indicator mounted near the blowing engines, on the engine itself or on a switchboard nearby, and with a recording instrument, if desired in the master mechanic's office, a perfect regulation and record of the speed can be secured.

Fig. 2.—Tachometer With One Recording and Two Indicating Instruments.

There are many tests which constantly have to be made where an electric tachometer of this character will prove particularly advantageous. As an instance might be cited the locomotive tests which are run by several universities and larger railroads that have testing departments in which the speed of the driving wheels can be readily determined.

Another use of this electric tachometer is on war vessels and merchant ships where it is particularly desirable to indicate the speed of the propeller shaft not only in the engine room, but also frequently in the chart house and on the bridge. In the case of the United States battleships the small generator is driven by gears direct from the main propeller shafts and three indicating instruments are connected to the one generator to indicate the speed at various points about the ship. This is particularly desirable in maneuvering, where a space of, say, 200 yards must be maintained between each ship. If the ship in the rear is gaining on the forward one, by signaling for one or two revolutions slower speed, the desired position can be maintained.

Electric Storage Battery Company Celebrates Twenty-Fifth Anniversary.

That the success of large manufacturing corporations depends to a great extent upon the loyalty and co-operation of the men in their factories was the statement made by Herbert Lloyd, president and general manager of the Electric Storage Battery Company, at a banquet recently given in the company's new building at Nineteenth Street and Allegheny Avenue, Philadelphia, Pa.

The occasion was the twenty-fifth anniversary of the founding of the company and the official house warming of the new six-story reinforced-concrete structure which adjoins the former plant. Present at the banquet were 73 persons, the majority of them heads of the various departments in the factory.

The diners were treated to a vaudeville entertainment at the conclusion of the banquet. The menu was unique; instead of being called a menu it received the name of schedule. The food was designated by terms used in the various departments of the storage battery company.

The house warming was officially opened by Edward G. Steinmetz, superintendent of the factory, who acted as chairman. In a brief address he explained the object of the dinner and then introduced Mr. Lloyd. The latter reviewed the history of the Electric Storage Battery Company since its inauguration in Gloucester, N. J. Mr. Lloyd added that much of the success of the company was due to the loyalty of the men and their efforts to aid in the progress of the concern. Many of the men who were with the company when it started are still with it.

The Electric Storage Battery Company started its career in Gloucester in 1888. Seven years later it moved to Philadelphia and took up its present site. During the past three years the business of the company grew to such a size that it was deemed advisable to erect another building. Consequently plans were drawn for the new plant and 18 months ago work upon it was started. The new structure is 300 feet long, 115 feet wide and six stories high.

Electric Storage Battery Company House Warming and Anniversary Banquet.

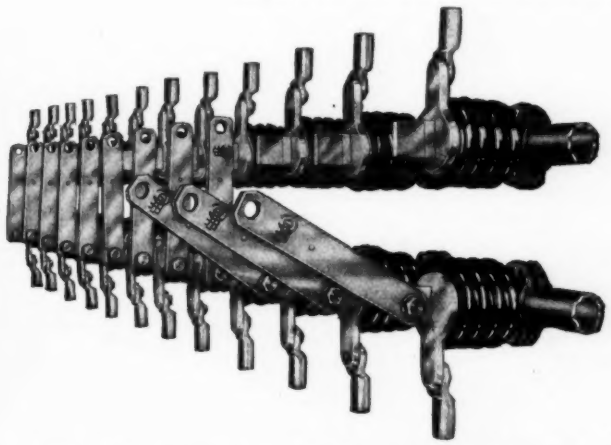
A New Idea in Disconnecting Switches.

It has been the general practice among manufacturers of disconnecting switches to use the single-blade idea in connection with the familiar sweated and pinned clip construction. Everyone who has ever used switches built in this manner freely acknowledges that the inherent weakness of a switch thus made is the probability of the clips not making good contact with the blade, if the switch heats sufficiently to melt the solder, thus causing the switch to heat still further, due to reduced contact surface area.

With the intention of surmounting such probable difficulties, a new line of switches has been designed in which the usual pair of clips is supplanted by a solid copper tongue, cast integral with the switch top. This tongue is milled so as to receive the two blades, which are made of the proper carrying capacity, and separated such a distance as to allow of their being firmly closed over the tongue, one on either side. The blades are equipped with take-ups, so as to compensate for wear on both the tongue and blades. This is shown quite clearly in the illustration herewith, the switch being of the 6,600-volt, 300-ampere type, for 1.25-inch pipe mounting. They were installed in the central station at Fort Worth, Tex.

Another interesting feature of construction is the absence of the usual unsightly clamps used to fasten the switch tops and bottoms to the porcelain. It will be noted from the illustration that these parts are so designed as to add materially to the appearance of the switch, the method of rigidly anchoring them to the porcelain being an original patented idea. All contact surfaces, current-conducting parts, and other essential dimensions are very liberally designed, the paramount idea being to give such a margin of safety that, as the station capacity increases, no fear need be felt as to their successful operation.

This style of switch construction has been standardized and a complete line is available, varying in capacity from 300 amperes to 2,000 amperes, and from 2,500 volts to 33,000 volts, for either pipe or flat-steel-base mounting, using corrugated porcelain or line insulators as may be desired. A decided advantage in such a construction lies in its being more rugged, simpler, and that it lends itself to the use of a locking device which becomes an integral part of the blade construction, being built in between the two blades thus contributing further to the idea of simplicity. The locking device is a very ingenious patented idea, being so constructed that only a single operation of a standard switch hook is required both to release the lock and open the switch.



Group of 300-Ampere, 6,600-Volt Disconnecting Switches in Fort Worth Power & Light Company's Plant.

The design, workmanship, material and finish are of the highest grade and consistent with other high-tension specialties manufactured by the Electrical Engineers Equipment Company, Chicago, Ill.

New Incandescent Lamp.

Cable advices from Paris, France, announce that M. Dussaud, a French scientist, has evolved a high-power incandescent electric lamp offering great advantages in photography. It is understood that through the medium of specially arranged filaments and a magnifying lens the light is concentrated at a single point, producing an illumination of great intensity with a very low energy consumption.

Peoria Electrical Show.

The second annual Electrical Show at Peoria, Ill., was opened to the public Saturday afternoon, January 18, to continue until and include Saturday, January 25. The show was held in the Coliseum, a large building designed especially for affairs of the kind. It opened with a collection of exhibits which practically filled all available space, and which was unusually varied. Moreover, the exhibits were of a kind which could not but prove interesting and instructive to the electrician and engineer as well as to the layman and casual visitor. Besides the exhibits, there were a number of features provided for the special entertainment of visitors each day, these including musical concerts, popular lectures, motion-picture shows and so on.

A thing which impressed the visitor to the Coliseum especially was the frequent evidence of good taste in the arrangement of the exhibits. A number of these were arranged by ladies, who were in charge of them.

George W. Hill, of Peoria, is the president of the Electrical Show Association, and LeRoy A. Mills the secretary.

List of Exhibits.

For the display of amateur electrical apparatus two standard spaces were employed, where a large quantity of apparatus, all of it interesting and much of it useful, which had been designed and built in the Peoria schools, was shown. L. P. Garsline was in charge of the exhibit.

The Apex Appliance Company of Chicago had a line of vacuum cleaners and electrically driven washing machines on exhibition. C. Swanson was in charge.

Miss Hazel Neff looked after the exhibit of the W. B. Brown Company, Bluffton, Ind. The exhibit included some unique designs of lighting fixtures, the wooden fixtures proving especially interesting to visitors to the show.

The Central Telephone & Electric Company, of St. Louis, Mo., occupied space No. 31, where C. H. Wallis, assisted by R. R. Wallis, answered inquiries concerning the collection of fans, hair and shoe driers, Hotpoint specialties, etc., on exhibition.

The Chicago Fuse Manufacturing Company, represented by William E. Finlay, had a large exhibit of fuse protective material, conduit fittings, sectional switch boxes, etc.

In charge of the section occupied by the ELECTRIC REVIEW AND WESTERN ELECTRICIAN were George W. Steenbergh and J. D. Downer, with sample copies of the journal, of the *Electrical Blue Book* and various other publications of the Electrical Review Publishing Company.

One of the most complete exhibits in the Coliseum was that of the Holophane Works of the General Electric Company. It included full lines of iris, cut-glass, veluria, prismatic glass, and Holophane D'Olier reflectors, in all styles. The Holophane Company also furnished the reflectors used in lighting the body of the Coliseum. These consisted of seventy-five 15-inch veluria urnolites, each one of which was equipped with a 400-watt Mazda lamp, these being furnished by the Westinghouse Electric and Manufacturing Company. The display was in charge of F. L. Lewis and J. W. Foster, both of Chicago.

The Illinois Traction Company favored the Electrical Show each day with interesting demonstrations of signaling and interlocking devices for railway service. C. A. Willoughby was in charge.

In the booth of the International Correspondence Schools, a line of textbooks and numerous specimens of work done by students were on show. B. H. Tipton, of Peoria, was in charge.

E. N. Johnson, of Chicago, was kept busy explaining the operation of an electric blower for pipe organs, which the Kinetic Engineering Company has on the market.

Mathias Klein & Sons, of Chicago, exhibited a complete line of the lineman's tools and similar electrical specialties for which this company is so well known. F. W. Herbst, of the Chicago office, was on hand to look after the exhibit.

T. B. Sweet, who represented C. S. Knowles, of Boston, had charge of a large display of the electrical appliances which this firm manufactures. Prominent among these were the new Zee socket, the Universal adaptable switch, and a collection of conduits, street-railway supplies, insulator clamps, etc.

Mrs. E. J. Chidester, of Chicago, represented the Lindstrom-Smith Company, of that city. Electric heating devices, vibrators, hair driers, electric irons, etc., were shown in the company's booth.

The Loetscher-Ryan Manufacturing Company, of Dubuque, Iowa, was represented by P. H. Thomas, and the display included an interesting collection of electric water heaters, electric irons, etc.

LeRoy A. Mills was in charge of the booth of the Mills Electric Company of Peoria, and there were six other men on hand to show visitors every possible courtesy. The Company maintained an attractive rest room, in addition to its display of electrical goods.

The Palmer Electric Company, of Peoria, had an interesting collection of lamps, fixtures, heating devices, etc., on exhibition, and the exhibit was managed by Mrs. C. McKnight.

System Magazine and *Popular Electricity Magazine* both had space in the show, represented by William Scheller and W. H. Sterling, respectively.

H. J. Morey, of Solvay, N. Y., and Frank Driscoll, of Chicago, were on hand as representatives of Pass & Seymour, Solvay, N. Y. At this company's booth there were on display full lines of sign receptacles, porcelain sockets, and a board of conduit box and condulet receptacles and fittings. Much of these materials were arranged on boards in such a way as to illustrate their use and bring out their advantages.

The exhibit of the Pelouze Manufacturing Company, of Chicago, was in charge of Albert A. Guardia, traveling sales manager. It included electric heating devices, the new Pelouze combination electric comb and curler; electric toasters, chafing dishes, percolaters and various other electrical appliances for the dining room and the kitchen. A particularly prominent feature of the display was the Pelouze electric iron, in which the temperature is controlled by means of a switch on the iron itself.

The Peoria Gas & Electric Company had an exhibit of unusual completeness, particularly along the line of electrical appliances for domestic use. Miss K. N. Mullig was in charge, and representatives of the Westinghouse Electric & Manufacturing Company and the General Electric Company were on hand also to answer questions concerning goods of these companies which were exhibited here.

W. L. Cummisky represented the Robbins & Myers Company, of Springfield, O., and the exhibit included a line of electric fans and the like.

The Schipper & Block Company, of Peoria, was represented by H. H. Badger, who was on hand to answer questions concerning the collection of electric heating devices, lamps, fixtures, etc., of which the company's exhibit consisted.

In conclusion the display of motion-picture films illustrating the advantages of domestic electric appliances should be mentioned. This collection was quite complete, and other pictures were interspersed among the films mentioned to prevent the displays from assuming too much of sameness. The films were supplied by electrical manufacturers.

Byllesby Convention Postponed.

The fourth annual convention of H. M. Byllesby & Company and affiliated companies, which was expected to be held January 23 and 24, has been postponed until June.

Current Electrical News

LIGHTING AND POWER.

(Special Correspondence.)

COVINA, CAL.—Plans and specifications are being prepared for an ornamental lighting system.

WILLOWS, CAL.—The Oro Light & Power Company has been granted a franchise to operate in this city.

DEVILS LAKE, N. D.—The city council has decided to have a "White Way." Bids will be opened on February 10. C.

HENDERSON, KY.—The municipal electric light and power plant in this city is to be improved in the near future at a cost of $25,000. G.

ABINGDON, ILL.—The Abingdon Light & Power Company has been granted a franchise to operate an electric light plant in the city. Z.

EASTLAND, TEX.—The local electric light plant, owned by A. A. Abney, which was recently destroyed by fire, will be immediately rebuilt. D.

YUBA CITY, CAL.—The Oro Electric Corporation has applied for a franchise in Sutter County. Bids will be received for the sale of the same up to March 4.

WILLIAMSTOWN, KY.—An electric plant capable of supplying current to about 1,000 20-candlepower incandescents is to be established by J. M. Riley, of this city. G.

LOS ANGELES, CAL.—The Southern California Edison Company has applied for authority to issue $2,500,000 of bonds to carry out an extensive scheme of improvements.

HOPKINSVILLE, KY.—Plans for a new power plant of considerable capacity, at this place, costing $100,000, have been completed by the Kentucky Public Service Company. G.

ALEXANDRIA, IND.—The People's Power & Light Company has been incorporated with a capital stock of $500,000. The directors are C. M. C. Schank and others. Z.

COLUSA, CAL.—Bids will be received up to February 4 for a franchise for transmitting electricity in Colusa County, which was applied for by the Oro Electric Corporation.

ELIZABETHTOWN, KY.—Articles of incorporation have been filed by the Tygart Valley Water Power & Electric Company, by D. H. Hall and others. The company is capitalized at $20,000. G.

EDGEMONT, S. D.—Negotiations are being conducted by the City Council with the Dakota Power Company, of Rapid City, and electricity will be brought 60 miles from Rapid City for light and power purposes. C.

CINCINNATI, O.—Tietig & Lee are the architects for the new hospital, which includes an electric light and power plant of considerable capacity, which is to be erected under the supervision of the Cincinnati Hospital Commission. G.

FERN CREEK, KY.—The Fern Creek Improvement Club has asked the Louisville Lighting Company to extend its lines to that suburb, and the request will probably be complied with in the near future. G.

NORTH ARLINGTON, N. J.—The Borough Council has instructed its Lighting Committee to confer with the Public Service Electric Company relative to the installation of an electric street-lighting system. A.

LEXINGTON, KY.—The Bluegrass Commission Company, of this city, has engaged the Burrell Engineering & Construction Company, of Chicago, to plan and erect an electrically-operated grain elevator for it in this city. G.

ORANGE, N. J.—The Building Committee of the Common Council has been instructed to investigate the cost of extending the municipal electric lighting system to render service to all public schools and public buildings. A.

CINCINNATI, O.—Stewart & Stewart have been engaged as architects by the Kentucky Motor Sales Company, of this city, to plan a $30,000 electric light and power plant for that concern. The plant will average 30-kilowatts capacity. G.

KANSAS CITY, MO.—The Kansas City Council is debating the question of a municipal electric light plant. It is believed it would pay the city to take $4,000,000 and build the plant to supply the city with electric current and also supply current for sale.

CEDAR FALLS, IOWA.—The city engineer and Councilman Arey, have returned from an inspection of municipal lighting plants in other cities with much information to use when the Council again takes up the proposition of the Citizens Gas & Electric Company for a new franchise. C.

BAKERSFIELD, CAL.—Bids will be received up to February 10 for a 50-year franchise in Kern County for an electric tower and wire system across certain public highways, application having been made by the Southern Sierra Power Company.

PETERSBURG, IND.—Floods in the White and Patoka Rivers have put out the lights in the Petersburg Electric Light plant, and otherwise greatly damaged the machinery and apparatus, and it is thought the plant will have to be rehabilitated. S.

TUSCOLA, ILL.—The Central Illinois Public Service Company is preparing to build a transmission line between Tuscola and Arcola to supply the latter city with light and power. The line will also supply power to the Reuple elevator and business houses and residences at Galton.

EAU CLAIRE, WIS.—The Eau Claire Business Men's Association appointed a committee empowered to put through to a successful conclusion the "White Way" on North Barstow, South Barstow and Grand Avenue, east. J. E. Cass, president of the association, is chairman of the committee. C.

TUSCOLA, ILL.—County officers of Douglas County and residents of the city have presented a petition to Fred C. Rahn, chairman of the County Board of Supervisors, requesting him to call a special meeting to consider the erection of a county electric light plant. The Central Illinois Public Service Company has been supplying power and heat for the building. Z.

SACRAMENTO, CAL.—The Great Western Power Company has asked permission to issue first-mortgage five-per-cent 40-year gold bonds to an amount sufficient to yield $3,791,731, to be used for improvements and extensions of its California properties. Among other things the company desires to complete the big dam now in course of construction in the Big Meadows Basin.

VICTORIA, B. C.—The Skidegate Indians of the Queen Charlotte Islands, whose village lies at the Southern end of Vancouver Island, propose, during the coming year, to install an electric system for lighting their village and furnishing power for a variety of industrial enterprises to be carried forward on a co-operative plan. The honorary president of this band is the Duke of Connaught, Governor-General of Canada.

ELK CITY, OKLA.—The Elk City Light & Power Company and the Elk City Ice & Fuel Company have been merged under the name of the Elk City Ice, Fuel & Light Company. The capital stock is $60,000 and W. T. Harvard, A. E. Fritsche and D. M. Brenneman, all of Hobart, are the incorporators. W. E. Corn will be general manager and E. W. Merrifield, superintendent of the light plant. Mr. Merrifield has been instructed by the stockholders to secure bids on a generator and new engine of 200-kilowatts capacity. P.

TORONTO, ONT.—The Hydro-Electric Power Commission of Ontario, Engineering Department, has announced that it will soon call for tenders for the various materials in connection with the construction of 125 miles of double-circuit transmission line at 110,000 volts, and the equipping of substations for transforming of 20,000 horsepower from the line to 13,200 volts. Various types of apparatus will be considered, including the different materials for conductors and different types of steel construction for supports. It is understood that specifications have already been issued.

PASSAIC, N. J.—The New Jersey Power Company has made application

for an electric light and power franchise to the Passaic Board of Works. The company has been granted permission to erect a large dam across the Neversink River, near Bridgeville, N. Y., and in connection proposes to erect a large hydroelectric power plant with transmission and distributing system in Northern New Jersey. A railroad line will also be built.

ST. CHARLES, VA.—The Electric Transmission Company, organized at Bristol as a result of the efforts of Benjamin L. Dulaney, a Bristol millionaire, and other capitalists interested in the development of the Lee County, Va., coal fields, has just let contracts for the erection of a central electric power plant at the pit mouth, near this place. Besides providing power to all operators in Lee County, transmission lines will be extended to Toms Creek, Stonega and other districts, and the present individual steam plants will be eliminated. This unit of construction involves an investment of about $300,000. Later the transmission lines are to be extended to Bristol and Knoxville and into the Piedmont and Appalachian sections, to give auxiliary power to the water powers already developed. When this is done the company will have expended upwards of $1,000,000.

GREAT FALLS, MONT.—Plans are being formulated by the Montana Power Company for the construction of a double power-transmission line, 150 miles long, as a result of a contract recently obtained by which the Great Falls Power Company secures the rights of way over the public domain for its power-transmission lines to be used in the electrification of the Chicago, Milwaukee & Puget Sound Railway. The Montana Power Company controls the Butte Electric & Power Company, the Madison River Power Company, the Missouri River Electric & Power Company and the Billings & Eastern Montana Power Company. It has an authorized capital of $75,000,000 common stock and $25,000,000 preferred stock, of which there are outstanding $4,700,000 preferred stock and $27,134,000 common stock. The consolidation of the subsidiary companies under the Montana Power Company and the close affiliation of the Great Falls Power Company make possible the electrification of the 450 miles of railway line.

GRAND JUNCTION, COLO.—Fred L. Lucas, of Denver, is the engineer in charge of a project for the irrigation of 200,000 acres of land in Dolores County and extending north to the Southern limit of the Paradox Valley, by a $6,000,000 hydroelectric power plant to be built a few miles above the town of Dolores on the Dolores River, in connection with the general centralization of electric and power plants in western Colorado. A corps of 40 engineers is at work on the undertaking. It is understood that the president of the Atchison, Topeka & Santa Fe Railroad is president of the irrigation company, which is to install the Dolores project. Mr. Lucas also is connected in an engineering capacity with the Utah Light & Power Company, the new $40,000,000 corporation that is obtaining control of many electric plants in western Colorado. He is negotiating for the purchase of the Redlands power plant near this city. The Redlands plant furnishes power for pumping water 300 feet to irrigate 10,000 acres of land.

TELEPHONE AND TELEGRAPH.

(Special Correspondence.)

ALPINE, TEX.—The Pecos & Rio Grande Telephone Company is preparing to install a direct copper line to Marfa.

ELSINORE, CAL.—The Southwestern Home Telephone Company has been granted permission to operate in this city.

VISALIA, CAL.—The Woodlake Telephone Company which was organized a short time ago is preparing to install an up-to-date system.

COSMOPOLIS, WASH. — The North River Telephone Company, having a capital stock of $2,500, has been organized with offices here. C.

BURNET, TEX.—The Smart Telephone Company of this place has been sold to A. L. Collins, of San Angelo, who will extend and improve the system. D.

COKATO, MINN.—Farmers in the vicinity of Lake Sylvia are talking over plans to build a telephone line to connect with the Annadale exchange. C.

BAKERSFIELD, CAL.—Bids will be received up to February 10 for a 50-year franchise to operate a telephone line over certain public highways in Kern County.

LEONARD, N. D.—Owners of the different telephone lines centering at Leonard have decided to install a switchboard to connect all the lines with the long-distance system. C.

WILTON, N. D.—Farmers in this vicinity have organized the Grass Lake Rural Telephone Company. So far $1,100 has been raised. Amod Thor is president and John Noon, secretary.

HADDONFIELD, N. J.—The Borough Council has voted to accept a proposition tendered by the Keystone Telephone Company for the installation of a police and fire alarm system.

BRECKENRIDGE, MINN. — The County Commissioners have arranged to build a telephone line to the poor farm. Judson Smith of the first district is the new chairman of the board.

NEWARK, N. J.—The Common Council has adopted a resolution to investigate the possibilities of an underground conduit system for all municipal overhead lines, including police and fire-department service. A.

SAN DIEGO, CAL.—The Pacific Telephone & Telegraph Company is planning to erect a $40,000 sub-station on University Avenue. It is reported the new station will entail an outlay of approximately $138,000.

ATKIN, MINN.—The Lone Lake Telephone Company has been organized and will build a line into Aitkin, and have connection with the Aitken-Deerwood Company's wires. E. A. Swanson is president. C.

DALLAS, TEX.—The Dallas Automatic Telephone Company has adopted plans for doubling the capacity of its exchanges in this city. The enlarged plant will provide for 20,000 telephones.

VANCOUVER, B. C.—J. A. Thorne has been instructed by the Dominion Telegraph Company to investigate the mose feasible route for a telephone and telegraph connection with the wireless station at Dead Tree Point from the north end of the island, and to give estimate of the cost of same.

ELECTRIC RAILWAYS.

(Special Correspondence.)

ANTIOCH, CAL.—The Oakland, Antioch & Eastern Railway Company has been granted a franchise over certain streets in this city.

PACIFIC GROVE, CAL.—The Monterey & Pacific Grove Railway Company has been granted a franchise for an electric railroad in this city.

SANTA BARBARA, CAL.—A survey is being made for the extension of the street car system to the Normal school, and construction work will start as soon as possible.

RANIER, MINN.—The Village Council passed an ordinance granting to the American Traction Company right to construct and maintain a system of street railways within the village. C.

INDIANAPOLIS, IND.—The Universal Traction Company has been incorporated with a capital stock of $50,000. The incorporators are Truman B. Funk, William D. Myers and James E. Kepperly. Z.

NASHVILLE, TENN.—The Nashville & Gallatin Railway Company, now constructing a line between Nashville and Gallatin, is planning extensions of its system through Kentucky to Indiana. G.

PHOENIX, ARIZ.—C. C. Lewis president of the Salt River Valley Electric line, known as the "White Line," has asked for a right of way over county roads between Phoenix and Mesa, via Tempe.

PADUCAH, KY.—A bond issue of $1,500,000 has been authorized by the Kentucky Southwestern Electric Railway, Light & Power Company and the funds therefrom will be expended in the spring in the construction of new electric railways and other electrical work which is to be commenced in April. G.

TULSA, OKLA.—Improvements contemplated by the Tulsa Street Railway Company during the year of 1913 will cost approximately $100,000, according to the statement of one of the officials of the company. Probably the most extensive improvement planned is the extension of one of the car lines through East Tulsa into Belleview addition.

OMAHA, NEB.—Harvey Musser, of Akron, O., president of the Omaha, Lincoln & Beatrice Interurban Railroad Company, has presented a proposition to the State Railway Commission to issue $3,100,000 of stocks and bonds for the purpose of constructing the proposed line. Associated with him in this enterprise is S. W. Ladd, of Detroit, representing a construction company which may agree to build the line in return for stock and bonds. The interurban company has not perfected its plans, but a formal application will be made to the State Commission in the immediate future.

SHARON, MASS.—The electric car line from Sharon Heights to the Canton line at East Sharon, and the line from the Norwood and Canton town lines to Bay street, Norwood Centre, belonging to the Sharon, Canton & Norwood Street Railway Company, have been acquired by M. A. Cavanagh, of Boston; Joseph B. Murphy, Thomas F. Cavanagh, James T. Dunn and Colonel P. Corr, of Taunton. Plans have already been drawn up by the new owners to extend the tracks through to Taunton, making a long de-

sired direct line between Sharon and Taunton. M. A. Cavanagh is president of the new company.

ALLENTOWN, PA.—The Lehigh Transit Company, operating all of the extensive trolley systems in the vicinity of Allentown, is making arrangements to extend its Slatington line to Lehigh Gap, Palmerton, Weissport and Lehighton, connecting at the latter place with the system of the Carbon County Transit Company. By the completion of this link there would then be a continuous trolley system extending from Pottsville to Philadelphia, and the only remaining link to be constructed to connect the trolley and electric systems of Luzerne and Lackawanna Counties with the same, is between Pottsville and McAdoo.

SAN LUIS POTOSI, MEX.—It is authoritatively learned that Hoogwhingel, Anthony Brown & Company, of London, England, has acquired the street railway systems of the cities of San Luis Potosi, Leon Guanajuato, Torreon and Tampico. This firm is said to be a subsidiary of S. Pearson & Son, Limited, which already has very large investments in Mexico. The street railway lines in all of these cities are to be reconstructed and converted into electric traction. The work of rehabilitating and extending the system in San Luis Potosi has already been started and preparations are being made to begin similar work in the other cities. G. H. Hoogwhingel is directing the improvement work. D.

SAN ANTONIO, TEX.—The San Antonio & Austin Interurban Railway Company has been organized with principal office here for the purpose of constructing and operating an interurban electric railway between San Antonio and Austin, a distance of about 85 miles. The directors for the first year are Vories P. Brown, W. B. Tuttle, Jesse B. Oppenheimer, Sam C. Bell, all of San Antonio; H. G. Henne of New Braunfels; C. L. Hopkins, of San Marcos, and A. J. Eilers, of Austin. The list of incorporators is composed chiefly of bankers and leading business men of San Antonio, New Braunfels, San Marcos and Austin. It is estimated that the construction and equipment of the proposed line will cost approximately $3,000,000. Mr Tuttle, one of the directors and chief promoter of the project, is general manager of the San Antonio Traction Company. D.

NEW INCORPORATIONS.

OKLAHOMA CITY, OKLA.—A charter has been issued to the Electric Call & Alarm Company, having a capital stock of $100,000. The incorporators are P. A. Huddleston, D. M. Huddleston and A. L. Davis.

NEW YORK, N. Y.—The Republic Mica Company, Incorporated, has been incorporated with a capital stock of $5,000 to manufacture mica products, insulating materials, etc. The incorporators are Charles J. Busick, Brooklyn; George A. Purcell, Jersey City, N. J.; William Rayner, Yonkers, N. Y.

INDIANAPOLIS, IND.—The McCray Manufacturing Company has been incorporated to establish a plant to be operated by electric and other power for the manufacture of all kinds of electrical machinery and apparatus. The capital stock is $50,000 and the directors are John E. McCray, Harrold A. McCray and William W. Spencer. S.

PROPOSALS.

ILLUMINATING PLANT.—Sealed proposals will be received by the Commission de Puertos, Santiago, Chile, until September 10, on an illuminating plant for the port works.

STEAM TURBINE AND GENERATOR.—Sealed proposals will be received by A. W. Mayberry, chairman of Commissioners, Moose Jaw, Sask., Canada, until February 10, for furnishing a steam turbine and generator of 1,500-kilowatts capacity.

LIGHTING SYSTEM.—Sealed proposals will be received at the office of the Commissioners of the District of Columbia, Washington, D. C., until January 28 for the installation of conduits, wires and fixtures for an electric-light system at the Home of the Aged and Infirm at Blue Plains, D. C. Specifications, etc., may be obtained from the Chief Clerk, Engineering Department, Room 427, District Building, Washington, on deposit of $10.

ELECTRIC CONDUITS AND WIRING AND INTERIOR LIGHTING FIXTURES.—Sealed proposals will be received at the office of the Supervising Architect, Washington, D. C., until February 20 for the electric conduit and wiring and interior lighting fixtures of a three-story building for the post office at Augusta, Ga.; until February 28 of a three-story building for the post office at Pocatello, Idaho; until March 1 of a one-story building for the post office at Frankfort, Ind. Drawings and specifications may be obtained from the custodians of the sites or the Supervising Architect.

FOREIGN TRADE OPPORTUNITIES.

(*Parties interested in the following items should address the Bureau of Foreign and Domestic Commerce, Washington, D. C., and refer to the file number noted.*)

NO. 10,192. ELECTRIC AUTOMOBILES.—A report from an American consular officer states that a company in his district, manufacturing explosives, is considering the question of purchasing commercial electric cars for the transportation of explosives in order to meet Government requirements, and is anxious to enter into negotiations with an American firm for the purchase of a trial car, which, if satisfactory, will doubtless lead to the placing of an order for many more.

NO. 10,242. ELECTRIC CRANES.—The American consul at Montevideo, Uruguay, reports that the Minister of Public Works has called for tenders for the supplying and installation of five electric cranes, destined for the customs warehouses called "Santos," "Aduana Nueva," "Herrera y Obes" and "General Artigas." Tenders will be received until March 29.

NO. 10,214. VACUUM CLEANERS AND DUST PROTECTING MATERIALS.—A report from an American consul in a European country states that a local firm wants to buy all kinds of vacuum cleaners and dust protecting materials.

No. 10,222. GENERATING PLANT AND CABLES.—Authority is being sought from Parliament for the building of an electric generating plant and for the purchase of cables at Port Glasgow and Greenock. The probable expenditure is estimated at $291,990.

NEW PUBLICATIONS.

SAN FRANCISCO TRAFFIC AND TRANSPORTATION DEVELOPMENTS.—Preliminary report No. 10, part 2, and No. 11, devoted respectively to development of transit system extensions immediate and future, and traffic general service in the downtown district, submitted by Bion J. Arnold, consulting engineer to the Board of Supervisors of the City of San Francisco, have been published in booklet form.

SOUTHWESTERN ASSOCIATION.—The *Proceedings* of the seventh annual convention of the Southwestern Electrical & Gas Association, held at Houston, Tex., in 1911, has appeared as a bound volume. About one-half of the volume is devoted to the question box, the questions and answers of which have been arranged according to subject matter. The *Proceedings* for 1912 are now in the hands of the printer and are promised soon.

UNION ELECTRIC BULLETIN.—The Union Electric Light & Power Company, St. Louis, Mo., has begun the publication of the *Union Electric Bulletin*, mentioned some weeks ago in this journal. The first issue is dated January, 1913, and a regular monthly appearance is promised. The first issue contains 28 pages of good typographical appearance and has departments devoted to the different organizations within the company, such as the sales department, operating department, accounting department, etc. The editor is L. C. Davis, and he is assisted by a staff of associate editors. There is to be no charge for the bulletin.

PHYSICAL LABORATORY OF THE LAMP ASSOCIATION.—The Physical Laboratory of the National Electric Lamp Association has begun the publication of an *Abstract Bulletin*, containing comprehensive abstracts of every research which has been carried out in the laboratory up to the middle of last year. These investigations, covering work in physics, physiology and psychology, have been described in papers published in various scientific and technical periodicals. In this first issue of the *Bulletin*, which is dated January, 1913, will be found abstracts of 28 papers, covering 127 pages. The abstracts are copiously illustrated, both cuts and typography being of high quality, and the paper is not only free from glare, but also of the first quality. The director of the laboratory is Edward P. Hyde.

NATIONAL ELECTRIC LIGHT ASSOCIATION PROCEEDINGS.—The proceedings of the thirty-fifth convention of the National Electric Light Association, which was held at Seattle, Wash., June 10 to 13, 1912, have been published by order of the executive committee. Vol. I contains the report of the general sessions, executive session, public policy session and company session. A fine half-tone portrait of John F. Gilchrist adorns the volume as a frontispiece. Vol. II contains a report of the commercial sessions. Vol. III contains the reports of the power transmission sessions and the technical sessions. Vol. IV contains the report of the accounting session. The books have been produced by the James Kempster Printing Company, of New York City, and are a fine example of high-class printing and bookmaking.

FINANCIAL NOTES.

Uncertainty with regard to the immediate future of security values and a depressing anxiety due to a lack of confidence in speculative features, have caused a considerable falling off in public participation in the stock market. The continued agitation for reform has kept the public away from speculative features, and despite apparently strong fundamental conditions and sustained reports of earnings and industrial activity, there is a condition of apathy that has caused some uneasiness in financial centers. The copper metal market has weakened considerably, and it is predicted that the decline in the price for electrolytic will not terminate until the 15 or 16-cent level is reached. The demand for electrical material and reports of new construction and adequate buying continue unabated. A significant tendency of improving price conditions is in the determination of the conduit manufacturers to advance prices five per cent during the last ten days.

The Bell Telephone Company of Canada's proposed increase of $3,000,000 in capital stock is offered at par in the ratio of one to five to stock of record January 15. The new stock will make outstanding stocks $18,000,000. Right to subscribe will expire at 1 p. m., February 28. On the basis of the present market for the stock of 168.5, the right is given a theoretical value of $11.50.

Preferred stockholders of the Bullock Electric Manufacturing Company, on which dividends at six per cent per annum were guaranteed by the Allis-Chalmers Company, have formed a protective stockholders' committee composed of Charles L. Harrison, R. C. Shinkle and George D. Eustis, all of Cincinnati. This action was taken in view of the prospective sale of the Allis-Chalmers properties, including the plants at West Allis, Wis., Chicago and in Canada, and the common stock of the Bullock Company, on February 3.

Directors of Detroit Edison Company have authorized the issuance of $3,000,000 new stock to stockholders, at par, to the amount of 30 per cent of present holdings. Detroit Edison has now outstanding $1,500,000 of six-per-cent debenture bonds, issued February 1, 1911, and convertible into stock of the company on and after February 1, 1913. Holders of these debentures will share the rights on the new stock. With the conversion of these debentures there will be substantially $9,000,000 of stock outstanding, on which the rights to the $3,000,000 of new stock will accrue. Detroit Edison is paying seven per cent dividends and is quoted around 131.

The electric Bond & Share Company has authorized an issue of $1,500,000 additional preferred stock, and $1,500,000 additional common stock. The directors have also voted an extra cash dividend of $1,500,000 to common stockholders, payable to holders of record January 14. The $1,500,000 preferred stock will be offered for subscription at par and accrued dividends to holders of preferred stock of record at the close of business January 14. The $1,500,000 common stock will be offered at par and accrued dividends to holders of common stock of record at the close of business January 14. With the issuance of the new stock the company will have outstanding a total of $5,000,000 preferred and $5,000,000 common stock.

The Missouri Public Utilities Company, a $1,000,000 corporation, to develop plants for the production of light, power, gas, ice and interurban electric railways in Southeast Missouri, has filed articles of incorporation at St. Louis. Already plants in several cities have been taken over, and it is intended to extend the operation of the new company over the entire southeastern section of the state. A main general central plant, to cost in the neighborhood of $500,000, will be located in as nearly the center of the territory served as possible. The plants taken over are in Charleston, Sikeston, Illmo and Fornfelt. Many other plants are being negotiated for, and several will be constructed.

Thomas Penney has retired as president of the International Traction Company and the International Railway Company, and E. G. Connette, who has been its vice-president, has been elected president of the International Railway Company, while Rodman E. Griscom has been elected president of the International Traction Company. Mr. Connette also has been elected a vice-president of the International Traction Company. Mr. Penney remains as a director of the International Traction Company and T. E. Mitten continues as chairman of the board of directors. G. L. Boissevain, Morris Cohen, Jr., James O. Moore, Oliver H. Payne, Nelson Robinson and George L. Selney, have retired as directors of International Traction, and S. Reading Bertron, Rodman E. Griscom, John S. Jenks, Jr., Marshall J. Dodge, Francis T. Homer and Edward G. Connette have been elected in their places.

A stock dividend payable out of the surplus in the common stock of the company has been declared by the Peerless Motor Car Company. This follows the announcement of an increase in capital stock, which enables the Peerless to provide for extension of its business. The company starts the year with a paid in capital stock of $4,200,000, and assets of between $5,000,000 and $6,000,000, after deducting liabilities, it is announced. A substantial block of the stock has been put in the hands of a group of Cleveland business men, who are also interested in the incandescent lamp business on a large scale. These men are F. S. Terry, H. A. Tremaine, B. G. Tremaine, J. B. Crouse and J. Robert Crouse.

The Utah Power and Light Company has taken over the electrical properties of the Utah-Idaho Sugar Company, which include a 10,000-horsepower hydroelectric plant on Bear River, near Colliston, Utah. The Utah Power and Light Company was recently organized to control a number of electric light and power properties in Colorado, Utah and Idaho. The company is contemplating an extensive hydroelectric development on the Bear River. It is reported that the San Juan Water & Power Company, of Durango, Colo., has been taken over, and options have been taken on other electrical properties in Colorado.

Dividends.

American Light & Traction Company; a dividend of 2 per cent on the preferred stock for the period of four months from September 30, 1912, to January 1, 1913, and the regular quarterly dividends of 2.5 per cent cash and 2.5 per cent in common stock on the common stock. Dividends on both issues are payable February 1 to stock of record January 15.

Commonwealth Edison Company; the regular quarterly dividend of 1.75 per cent payable February 1 to stock of record January 15.

Commonwealth Power, Railway & Light Company; an initial dividend of one per cent on its $12,000,000 of common stock, payable May 1 to stock of record of April 10. The regular quarterly dividend of 1.5 per cent on the $6,000,000 preferred stock has also been declared, payable February 1 to stock of record of January 14.

Manhattan Electrical Supply Company; a stock dividend of 100 per cent to common stockholders, payable February 3. Books closed January 12 and reopen February 4. The regular semi-annual dividends of three per cent each on the common and preferred stocks were also declared, payable on the same date.

Federal Sign System (Electric); a quarterly dividend of 1.75 per cent, payable February 1 to stock of record January 25.

Guanajuato Power & Electric Company; a quarterly dividend of 1.5 per cent, payable February 1 to stock of record January 17.

Kaministiquia Power Company; a quarterly dividend of 1.25 per cent payable February 15 to stock of record January 31.

Philadelphia Company the regular semi-annual dividend of 2.5 per cent on the preferred stock, payable March 1 to stock of record February 10.

Sierra Pacific Electric Company; a quarterly preferred dividend of $1.50 per share, payable February 1 to stock of record January 22.

CLOSING BID PRICES FOR ELECTRICAL SECURITIES ON THE LEADING EXCHANGES AS COMPARED WITH THE PREVIOUS WEEK.

	Jan. 20.	Jan. 13.
American Tel. & Tel. (New York)	133	139½
Commonwealth Edison (Chicago)	139	143¾
Edison Electric Illuminating (Boston)	280	286½
Electric Company of America (Philadelphia)	12	12
Electric Storage Battery common (Philadelphia)	53	54
Electric Storage Battery preferred (Philadelphia)	53	54
General Electric (New York)	181½	183½
Kings County Electric (New York)	129	129
Manhattan Transit (New York)	1	1⅛
Massachusetts Electric common (Boston)	16⅝	16
Massachusetts Electric preferred (Boston)	75½	76
National Carbon common (Chicago)	115	115
National Carbon preferred (Chicago)	117¼	117¼
New England Telephone (Boston)	156½	159½
Philadelphia Electric (Philadelphia)	22¾	23
Postal Telegraph and Cables common (New York)	80	86
Postal Telegraph and Cables preferred (New York)	67¾	67
Western Union (New York)	70¾	74¾
Westinghouse common (New York)	74	77
Westinghouse preferred (New York)	118	118
		2

*Last price quoted.

PERSONAL MENTION.

A. W. BUSH, of Mendota, Ill., has been appointed manager of the properties of the Illinois Northern Utilities Company at Sterling, Ill., to succeed T. R. WOULFE, resigned, effective February 1. J. W. LASHER, who has been manager for the company at Morrison, Ill., has been transferred to Mendota.

ROBERT J. DALEY, superintendent of the Municipal Bureau of Light, of Pittsburgh, Pa., was stricken with an attack of heart failure while on his way to his office on January 9. He was taken to Pittsburgh hospital. The physicians say he will recover. His illness is said to have been caused by overexertion.

N. I. GARRISON, for eight years auditor of the Fort Smith Light & Traction Company, has accepted the position of auditor of the Western States Gas & Electric Company, with headquarters at Stockton, Cal. The employees of the Fort Smith company tendered Mr. Garrison a banquet on January 14.

THOMAS A. WATSON, who was closely identified with Dr. Alexander Graham Bell in the development of the early telephone, read a paper entitled "Just Before and Just After the Birth of the Telephone," at the 141st meeting of the Telephone Society of New York, which was held at the Engineering Societies Building on the evening of January 22.

MORRIS N. FOX has not severed his connection with H. M. Byllesby & Company, which impression has been created due to an announcement of his removal from Chicago to Milwaukee. Mr. Fox will represent the bond department in Wisconsin instead of Illinois, which latter territory had been under his charge. He will have his headquarters at 733 Wells Building, Milwaukee.

M. R. LASH has been placed in charge of the underground cable department of M. B. Austin & Company, Chicago. Mr. Lash will specialize on installation and construction details of Safety steel-taped cable for underground systems of distribution. Mr. Lash was for nine years connected with the Western Electric Company, and for the last two years has been in charge of the new business department of the Union Electric Company, Dubuque, Iowa.

PHILIP S. DODD has resigned as director of the Commercial Development Department of the National Quality Lamp Division of the General Electric Company, to take up the work of secretary-treasurer of the Society for Electrical Development, Incorporated. This work has been very much under Mr. Dodd's direction ever since the Organiaztion Committee first started its labors, and his appointment to this important position will be learned with great satisfaction by his many friends and acquaintances in the industry.

MARTIN H. HOVEY, formerly a block signal inspector employed by the Indiana Railroad Commission, has severed his connection with the commission and has been employed by the interurban roads of Indiana to act as expert and to superintend the placing of automatic block signals on all the interurban roads of Indiana. This change is agreeable to the commission, which realizes the necessity of allowing the interurbans to employ an expert. Within a year and a half it is the purpose to have every interurban road in the state thoroughly equipped with automatic or other block signal systems.

C. E. ALLEN has been appointed assistant manager of the Detail and Supply Department of the Westinghouse Electric & Manufacturing Company, at East Pittsburgh, Pa. Mr. Allen has been closely identified with the transformer industry in various capacities for the last ten years, and has a wide circle of acquaintances in the electrical fraternity. He was born in the State of Virginia, and, after attending high school, entered the Virginia Polytechnic Institute, from which he graduated in 1901, and is now first vice-president of the Alumni Association of this institution. Immediately after graduation he entered the employ of the General Electric Company, taking the apprenticeship course. From

C. E. Allen.

here he was transferred to the engineering department where he was engaged in the design of transformers, on which work he was successfully employed for several years, having charge during most of this period of the development designs. While in charge of this work, Mr. Allen invented the "distributed-core type transformer," now being manufactured by the General Electric Company. Upon completion of this work he was transferred to the commercial department in which he continued until 1909, when he severed his engagement with the company. In the fall of 1909, Mr. Allen entered the employ of the Westinghouse Electric & Manufacturing Company, as head of the transformer division of the Detail and Supply Department, which position he retained until he assumed the duties of assistant manager. During the time he was at the head of the transformer division, the well-known Westinghouse type S distributing transformer was exploited, and its success was due, in no small degree, to his ability and aggressive salesmanship. Mr. Allen is an associate member of the American Institute of Electrical Engineers, and a member of National Electric Light Association, to which he has contributed several papers; the Jovian Order, and several other organizations.

CHARLES SANGES and FRANK NETTLES, both electricians of the Mobile Electric Company, Mobile, Ala., displayed rare bravery Thursday, January 9, in rescuing two firemen who had been buried beneath the debris in a fire which destroyed the Mobile Theater. Manager Jackson of the Mobile Electric Company says: "These men at the risk of their lives, were lowered by ropes attached to their belts into the smoldering tons of brick to rescue the lifeless body of one firemen and the injured body of the other. The red hot bricks were removed and the two firemen released from their awful predicament. Although burned and blistered, the linemen went back to their work, after receiving medical attention, and resumed their daily duties just as usual."

J. M. WAKEMAN, who has been appointed general manager of the Society for Electrical Development, Incorporated, has had a very wide and successful experience in publicity work and in handling the details of propaganda and advertising on a large and effective scale. Mr. Wakeman was for many years vice-president of the McGraw Publishing Company of New York, and general manager of the *Electrical World*. After an absence of nearly two and one-half years, the greater part of which was spent in his native country, England, Mr. Wakeman returned to New York in November last. The selection of Mr. Wakeman, for this important place, is viewed with great satisfaction, and he may be depended upon to throw into it a great deal of vigorous work, supplemented by an extraordinary prepossessing personality and ability to accomplish anything he undertakes in short order.

OBITUARY.

ANDREW JAMIESON died at Glasgow, Scotland, on December 4, 1912. Professor Jamieson was well known as the author of a number of books devoted to electrical and engineering subjects, including one of the earliest electrical handbooks. He also wrote numerous papers upon the laying of submarine cables. He was for some years a principal of the Glasgow College of Science and Art, afterwards becoming a consulting engineer.

JOSEPH P. ORD, a vice-president and director of the General Electric Company, died in New York City on January 9, after an illness of several months. Mr. Ord's home was in Albany, N. Y. He was 60 years of age and became connected with the General Electric Company more than a decade ago, and took an active part in its re-organization. Prior to his connection with the General Electric Company he was associated with the management of the West Shore Railroad.

FRANCIS BLAKE, 62 years old, inventer of the Blake transmitter, and a noted scientist and engineer, died suddenly on January 19 at Keewaydin, his country home, in Weston, Mass. In 1878 he invented the Blake transmitter, which has played an important part in the development of telephones throughout the world. Later he patented many other electrical devices, and was a director of both the American Bell Telephone Company and the American Telephone & Telegraph Company.

DATES AHEAD.

Efficiency Society. Annual meeting, New York, N. Y., January 27-28.

Western Association of Electrical Inspectors. Annual meeting, St. Louis Mo., January 28-30.

Minnesota Electrical Contractors' Association. St. Paul, Minn., February 1.

Thirteenth Annual National Automobile Show, Chicago, Ill., February 1-15.

Electrical Supply Jobbers' Association. Quarterly meeting, Buffalo, N. Y., February 11-13.

American Institute of Electrical Engineers. Midwinter convention, New York, N. Y., February 26-28.

Central Electric Railway Association. Annual meeting, New Washington Hotel, Indianapolis, Ind., February 27-28.

Minnesota Electrical Association. Annual convention, St. Paul, Minn., March 11-13.

American Electrochemical Society. Spring meeting. Hotel Traymore, Atlantic City, N. J., April 3-5.

Mississippi Electric Association. Annual convention, Natchez, Miss., April 21-23.

Iowa Electrical Association. Annual convention, Waterloo, Iowa, April 23-24.

Association of Railway Telegraph Superintendents. Annual meeting, St. Louis, Mo., May 20.

National District Heating Association. Fifth annual convention, Indianapolis, Ind., May 27-29.

National Electric Light Association. Convention, Chicago, Ill., June 2-5.

National Electrical Contractors' Association. Annual meeting, Chattanooga, Tenn., July 16.

With the Electrical Manufacturers

Mathias Klein & Sons, 562 West Van Buren street, Chicago, Ill., have made arrangements to manufacture and market the Eichhoff line builder's wire reel. This reel combines a take-up and pay-out reel in one. A descriptive circular is being prepared and will be mailed upon request.

The Leeds & Northrup Company, 4901 Stenton Avenue, Philadelphia, Pa., has issued bulletin No. 240, describing its new portable insulation-testing galvanometer. This equipment is a complete and compact set, including a d'Arsonval portable galvanometer, universal shunt, telescope and scale and standard high resistance.

The Emerson Electric Manufacturing Company, 2024 Washington Avenue, St. Louis, Mo., in its January issue of *The Emerson Monthly* gives a condensed summary and description of Emerson fan motors for 1913. Included in this line are fewer different types of fans than heretofore, but the ones listed are those found mostly in demand and most serviceable for various classes of use.

Brookfield Glass Company, 2 Rector Street, New York, N. Y., has issued a folder devoted to Brookfield insulators. Over 40 types of insulators are shown by means of sectional and dimension diagrams. This large number gives an idea of the varied classes of service for which these insulators are now manufactured, which include all classes from the lowest-voltage telephone to the highest-voltage suspension insulators.

Diehl Manufacturing Company, Elizabethport, N. J., has published bulletin No. 505, which describes the Diehl electric absorption dynamometer. The principle of this equipment is clearly set forth and the details of its construction and operation are fully described. Several views of the apparatus and its auxiliaries are shown. An installation of a complete Diehl laboratory equipment, including such a dynamometer, in the headquarters of the Automobile Club of America is also described and illustrated.

Delta-Star Electric Company, 617 West Jackson Boulevard, Chicago, has issued bulletin No. 2, devoted to high-tension switching and protective equipment. The bulletin is very completely illustrated and describes disconnecting switches, weatherproof sectionalizing switches, combination outdoor switches and fuses, choke coils, entrance bushings, combination disconnecting switch, fuse, choke coil and horn-gap arrester. Complete data are given of these different types of apparatus and the bulletin also includes much valuable technical data respecting copper wire, busbars and high-tension power transmission.

Wheeler Condenser & Engineering Company, Carteret, N. J., announces that it has acquired the American license to build turbo air pumps of the A. E. G. type as manufactured in Europe by the Allgemeine Elektricitäts Gesellschaft. This air pump is of the rotary-water-jet type, for motor or steam-turbine drive, air being removed from the condenser by the ejector action of a series of small water jets and also by positive entrapment of air between successive small slugs of water. A number of these pumps are now under construction at the works of the Wheeler Condenser & Engineering Company.

Fairbanks, Morse & Company, Chicago, Ill., has designed and is distributing to its friends in the industry, the Fairbanks-Morse "Current-O-Scope," a device which shows by means of a standard vector diagram the relation of the instantaneous values of an alternating current in a three-phase circuit, and by a simple mechanical device shows how these currents combined in the windings of a three-phase motor produce the phenomenon of the revolving field. This very interesting educational device is gotten up in substantial and attractive shape. It is made entirely of celluloid, properly printed in colors to establish certain representations to the student of the induction motor.

Allis-Chalmers Company, Milwaukee, Wis., has issued bulletin No. 1631. This is devoted to hydraulic turbines with spiral cast-iron or cast-steel casings. These machines are of four types designated as KH, KV, RH and TH, and have runners ranging from 14 to 80 inches. A large number of views of the machines and their details are shown and also many typical installations in prominent hydroelectric plants. Characteristic diagrams are given and very complete power and speed tables for 25 and 60-cycle runners of the A, B, C and D types. Governors and pressure regulators are also described in the way of auxiliaries and the bulletin concludes with a partial list of users of this equipment.

Ajax Sales Company, Grand Rapids, Mich., has issued bulletins Nos. 76 and 77. The first of these is devoted to the Ajax electric riveters. This machine is of unique construction and delivers from 1,800 to 3,400 blows per minute. The machine is driven by an electric motor varying from one-twentieth to one-half horsepower, depending upon the size of the machine. The machines are made in the bench, pedestal and stake types. Bulletin No. 77 describes electrically-driven plug drills. These machines are adaptable for drilling holes for anchor bolts, for drilling and splitting stone, concrete, marble, brick, etc. Two sizes of the machines are made, driven respectively by a one-fifth and one-half horsepower motor.

Westinghouse Church Kerr & Company, New York, N. Y., announce that they have been engaged as engineers and constructors for the following work, the materials and equipment for which have been purchased: Construction of a 14-mile extension to the Brinson Railway from Waynesboro to St. Clair, Ga., including roadbed, bridges, tracks, sidings, station, telephone lines, etc.; the design and construction of a power plant for hotel and bath house at White Sulphur Springs, W. Va., and equipment of the bath house with plumbing, heating and lighting facilities; the design and construction of a pile pier, 690 by 60 feet, and a structural-steel shop, 360 by 55 feet, with crane runway, heating, lighting and plumbing facilities, for John Coughlan & Son, Vancouver, B. C.

The Electric Storage Battery Company, Philadelphia, Pa., has issued a number of new publications attesting to the value of its automobile storage batteries. One of these is entitled "Motor Cars and Exide Batteries." This describes the four types of Exide

batteries suitable for electric vehicle propulsion and lighting, and for the ignition, lighting and starting of gasoline automobiles. Reference is also made to the use of these batteries for street-car operation. Another leaflet entitled "Power for Cranking Automobile Engines" is devoted particularly to Exide automobile-starting and lighting batteries. It emphasizes the value of the electric starting equipment, which is demonstrated by its greatly increased use from year to year and shows the peculiar adapability of the Exide battery for this purpose. Two other publications include a large number of letters that give the results of actual use of Exide batteries.

The Standard Underground Cable Company, of Canada, Limited, has established new branch offices at Montreal, Quebec, and Winnipeg, Manitoba, in order to facilitate the prompt handling of business. The Montreal office will handle all business from the Province of Quebec and the eastern part of the Province of Ontario. This office is in charge of R. G. Harris, formerly connected with the general offices of the Standard Underground Cable Company, Pittsburgh, Pa., but more recently with the New York sales office of that company. The Winnipeg office will handle all business coming from the Provinces of Alberta, Saskatchewan, Manitoba and a portion of the Province of Ontario lying west of Ft. William. B. S. Stewart has charge of this office. Mr. Stewart has been for some time in the general offices of the associate American company at Pittsburgh, later going to the Chicago sales office, where he has been for a number of years. The general offices of the company at Hamilton, Ont., will handle all business from the central and northern portions of the Province of Ontario. W. H. Marsh, sales manager and secretary of the company, has direct charge of the business coming into this office as well as general supervision of the various branch offices. Business originating in the Province of British Columbia and Alaska and Yukon Territories will be handled by the Seattle, Wash., office of the company and business from the Maritime Provinces will be handled by the Boston, Mass., office. This is a temporary arrangement in order to secure prompt service immediately for customers in those districts until the volume of business justifies the establishing of separate offices in the Dominion. The establishment of these branch offices puts the Standard Underground Cable Company, of Canada, Ltd., in an excellent position to handle all business which it may secure. The men in charge of the various offices are salesmen of experience and ability, released by the associate American company to strengthen the Canadian company's personnel.

Record of Electrical Patents.

Issued by the United States Patent Office, January 14, 1913.

1,050,094. Trolley Wheel. C. F. Bettmann, New Albany, Ind. Has a separate central portion that bears against the trolley wire.

1,050,101. Telephone Switchboard. P. C. Burns, Chicago, Ill. Relates to a combined jack and drop with an associated night-alarm circuit.

1,050,104. Differential-Microphone Repeater. J. J. Comer, assignor to Automatic Enunciator Co., Chicago, Ill. Has an adjustable spring for retracting the armature.

1,050,105. Electrically Heated Oven Construction. L. G. Copeman, assignor to Copeman Electric Stove Co., Flint, Mich. Has a flat heating element at the bottom and a drip trough beneath the edge of the door.

1,050,143. Trolley. J. A. Kinzey, Pittsburgh, Pa. Has an angularly disposed beveled trolley wheel on each side of the trolley wire.

1,050,149. Locked Guard for Electric-Lamp Bulbs. R. H. Leveridge, assignor to C. W. Leveridge, New York, N. Y. A wire guard with ring base secured against the cover of a junction box.

1,050,153. Automatic Stabilizer for Aeroplanes. L. Marmonier, Lyon, France. Includes an electric motor for synchronizing two gyroscopic pendulums.

1,050,162. Magneto Ignition System for Internal-Combustion Engines. W. F. Nickel, Brooklyn, N. Y. Combined magneto and distributor.

1,050,189. Electrometallurgical Furnace. J. Westly, Sulitjelma, Norway. A resistance furnace with electrodes immersed in the slag on a sloping bottom.

1,050,196. Insulating Support for Lamp Sockets and Reactance Coils. H. W. Young, assignor to Delta-Star Electric Co., Chicago, Ill. An insulator is interposed between the coil of a street-series reactance socket and the lamp post.

1,050,208. Controller for Electric Signs. E. H. Bickley, Detroit, Mich. A perforated ribbon moving over a lamp-terminal board gives the appearance of illuminated words and letters moving across the sign.

1,050,211. Electric Switch. M. Guett, assignor to Hart & Hegeman Manufacturing Co., Hartford, Conn. A door switch operated by the movement of the locking door bolt.

1,050,217. Electric-Lamp Stand. J. Ivans, San Francisco, Cal. Mounting for a lamp in a floral piece, the switch being in the flower pot.

1,050,223. Surface-Contact Electric Traction System. E. A. Mitchell, Carshalton, England. Describes the switches in the track units.

1,050,228. Electric Alarm System. H. Olley, assignor to Crouse-Hinds Co., Syracuse, N. Y. For use with branch lighting circuits.

1,050,239. Electrically Operated Sound-Producer. C. J. Schwarze, Adrian, Mich. Includes an electromagnetic diaphragm.

1,050,247. Shade-Holder. W. A. Stacey, assignor to Bryant Electric Co., Bridgeport, Conn. Has a threaded neck screwed into the socket shell.

1,050,250. Alternating-Current Cable Distributing System. A. E. Tanner and E. A. Claremont, Manchester, England. Each cable has an inner working conductor surrounded by several pressure-distributing conductors uniformly spaced and imbedded in the insulation.

1,050,255. Process of Hydroelectric Smelting. A. Tommasini, New York, N. Y., assignor of one-half to M. E. Thornton. The ore is fed through a sloping tube through which a current of hydrogen preheated by an electric arc is also passed, but in the reverse direction.

1,050,260. Ozone Generator. A. E. Walden, Baltimore, Md. Has several compartments with inner and outer electrodes and through which the air to be treated passes.

1,050,262. Insulated Rail-Joint. G. A. Deber, assignor to Rail Joint Co., New York, N. Y. Has insulation between the filler members, base and rails, fillers and shoe and rail ends.

1,050,280. Therapeutic Belt. C. A. F. Kruger, Greifenhagen, Germany. Has an electric battery and electromagnets mounted thereon.

1,050,284. Shade-Holder. H. J. Morey, assignor to Pass & Seymour, Inc., Solvay, N. Y. Has internal segmental lugs to snap over the bead on the socket shell, also a locking collar.

1,050,303. Article for Electrolytical Purposes. B. Schwerin, assignor to Gesellschaft für Electro-Osmose M. B. H., Frankfort-on-the-Main, Germany. A cell diaphragm molded from porous coherent carborundum.

1,050,304. Telephone Transmitter. C. E. Scribner, assignor to Western Electric Co. Relates to the granular-resistance unit.

1,050,307. Cloth-Cutting Machine. A. Spielman, Philadelphia, Pa. An electric motor drives an endless cutting band.

1,050,316. Automatic Railway Safety Device. E. Unverricht, Hamburg, Germany. An electrical signaling and train-controlling system.

1,050,328. Igniting Gas-Burners. C. F. Arnhorst, Chicago, Ill. Electrical ignition.

1,050,347. Adding Attachment for Typewriting Machines. M. C. Crawley, Orcutt, Cal., assignor to Addograph Co. Contains a series of key-controlled electromagnets.

1,050,358. Coin-Controlled Apparatus. G. H. Fullington, Detroit, Mich. Insertion of a coin closes an electric motor circuit.

1,050,372. Electric Air-Heating Device. F. P. Mies, Chicago, Ill. The heating element forms an inner layer on the curved surface of a centrifugal-fan casing.

1.050,404. Telephone Fixture. W. C. Ude, West Haven, Conn. A desk stand with a hinged receiver arm to permit the receiver to be swung against the user's ear.

1,050,418. Electric Ignition Device. J. E. Baldwin, assignor to Fulton Manufacturing Co., Erie, Pa. An ignition timer for internal-combustion engines.

1,050,431. Regulating Apparatus. D. H. Darrin, New York, N. Y., assignor to Automatic Switch Co. An electromagnetically operated valve.

1,050,436. Apparatus for Producing Rubber Strips. T. A. Edison, assignor to Edison Storage Battery Co., West Orange, N. J. A machine for cutting strips for battery insulation.

1,050,441. Electric Signaling Apparatus. R. A. Fessenden, assignor to S. M. Kintner, Pittsburg, Pa., and H. M. Barrett, Bloomfield, N. J. A wireless signaling system depending on frequency.

1,050,444 and 1,050,495. Alternate-Current Motor. V. A. Fynn, London, England. The first patent relates to a phase-displacing winding for a single-phase motor; the second relates to a magnetic shunt between the main inducing and field windings.

1,050,461. Make-and-Break Device for Ignition Systems. T. Hubert, assignor to American Circular Loom Co., Boston, Mass. The make-and-break contacts are mounted on a rotative plate.

1,050,465. Automatic Railway-Gate. G. Hyler and G. Fisher, Lansing, Mich. Operated by an electric motor.

1,050,466. Reflector. B. Jones, Jr., New York, N. Y. A lantern-shaped reflector casing with translucent bottom fits about the lamp. Directly beneath the lamp is a trough-shaped deflector to keep direct light from striking the translucent bottom.

1,050,468. Electric Traction System and Motor to be Used Therewith. K. De Kando, assignor to Westinghouse Machine Co. Has windings that can be reconnected to change the motor from a polyphase induction to single-phase or direct-current series commutating motor.

1,050,466.—Reflector.

1,050,493. Automatic High-Voltage Circuit-Breaker. E. O. Schweitzer and N. J. Conrad, Chicago, Ill. A fuse is kept under spring tension in a tubular casing containing an arc-extinguishing liquid about the fuse.

1,050,497. Motor-Control System. E. W. Stull, assignor to Allis-Chalmers Co. Series-parallel control for four-motor railway equipments.

1,050,503. Magneto Construction. B. Whelchel, assignor to A. C. Ayres, Indianapolis, Ind. The armature is inclosed.

1,050,513. Bell Attachment for Pianos and the Like. D. W. Barton, Oshkosh, Wis. Has an auxiliary keyboard whose keys are electrically connected to the bells.

1,050,514. Telephone-Call Indicator. B. L. Behrendt, Newark, N. J. A sheet is inserted between the vibrator and bell.

1,050,520. Key Shelf and Base. E. B. Craft, assignor to Western Electric Co. For telephone switchboards.

1,050,532. Party-Line Telephone System. B. C. Groh, assignor to Stromberg-Carlson Telephone Manufacturing Co., Rochester, N. Y. A lockout system with a short-circuit for each party's receiver controlled by the operator through individual relays.

1,050,534. Burnishing Machine. C. H. Hart, Hartford, and G. B. Stretch, Meriden, Conn. A ball-holding receptacle is mounted on an electromagnet.

1,050,554. Motor-Controlling Apparatus. D. L. Lindquist, assignor to Otis Elevator Co., Jersey City, N. J. For a shunt elevator motor.

1,050,563. Electrical Measuring Instrument. F. W. Roller, East Orange, N. J., assignor to Roller-Smith Co. A shunt with the instrument connections remote from the resistance laminae.

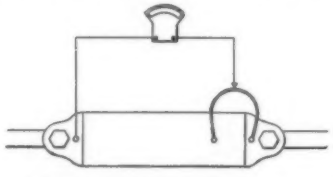
1,050,592. Circuit-Controller. J. M. Andersen, assignor to Albert and J. M. Anderson Manufacturing Co., Boston, Mass. Relates to the operating gear for a circuit-breaker with laminated contact bridge.

1,050,643. Overhead Construction for Electric Railways. E. E. Gilmore, Philadelphia, Pa. Describes means for guying a trolley curve.

1,050,652. Trolley Head. R. F. Henne, Mamaroneck, N. Y. The wheel is slidable on the shaft, being restrained by a spiral spring on each side inclosed in a telescopic casing.

1,050,662. Method and Means for Printing Telegraphy. I. Kitsee, Philadelphia, Pa. Impulses of opposite polarity are translated as dots and dashes, respectively.

1,050,663. Electric Transmission of Intelligence. I. Kitsee, assignor of one-half to W. J. Latta, Philadelphia, Pa. For simultaneous telegraphy and telephony.



1,050,694.—Adjustable Auxiliary Shunt for Ammeter.

1,050,664. Telegraphic Transmitter. I. Kitsee, Philadelphia, Pa., assignor of one-half to W. J. Latta. Has polarized relays and transformers for allowing opposing sources to impose currents on the line.

1,050,694. Electrical Measuring Instrument. F. W. Roller, East Orange, N. J., assignor to Roller-Smith Co. Associated with a main ammeter shunt is an auxiliary adjustable shunt.

1,050,728. Method of Signaling. R. A. Fessenden, assignor to M. Kintner, Pittsburgh, Pa., and H. M. Barrett, Bloomfield, N. J. An amplification of the wireless method described in No. 1,050,441.

1,050,735 and 1,050,736. Method of Producing Metallic Products From Iron Ore. H. L. Hartenstein, assignor to Electro-Chemical & Development Co., Pierre, S. D. The ore is treated in a heating chamber with carbon monoxide and then subjected to an electric current.

1,050,739. Starter for Explosive Engines. R. C. Hull, Phildalphia, Pa. A high-torque electric motor is used to turn the engine over.

1,050,740. Electric Switch. C. E. Knowlton, Rochester, Minn. A flush wall switch including knife blades operated by turning a horizontally pivoted button.

1,050,750. Electric Motor. O. H. Pieper, Rochester, N. Y. A single-phase commutator motor.

1,050,761. Driving Mechanism for Automobiles. A. F. Clark, assignor to S. Friedberger, Philadelphia, Pa. The motor is flexibly mounted and connected to the rear axles through bevel gearing.

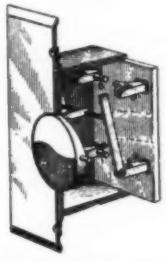
1,050,765. Time-Controlled Alarm System for Telephone Exchanges. P. J. Dell, Jr., Rochelle, Ga., assignor of one-half to J. N. King. Whenever a call drop is actuated during the time that the alarm is "on," the alarm circuit is closed.

1,050,777. Phonographic Wireless Telephone. A. F. Collins, Newark, N. J. A phonographic slot-machine operated by an electric motor.

Reissues.

13,510. Electrode. J. T. H. Dempster, assignor to General Electric Co. Original No. 976, 990, dated Nov. 29, 1910. A luminous-arc electrode containing magnetite, rutile and chromite with potassium carbonate at the arcing end.

13,514. Electrically Operated Gun Control. J. B. Ryan, assignor to Automatic Gun Control Co., New York, N. Y. Original No. 906,939, dated Dec. 15, 1908. Includes automatic control for a motor that keeps the gun steadily trained, despite the movements of the ship.



1,050,740.—Tilting-Button Wall Switch.

Patents That Have Expired.

Following is a list of electrical patents (issued by the United States Patent Office) that expired January 21, 1913.

553,264. Electric Railway. W. M. Schlesinger, Philadelphia, Pa.

553,296. Art of Manufacturing Electrical Incandescing Conductors. J. W. Aylsworth, Newark, N. J.

553,304. Electric Gas Lighting Apparatus. H. C. Farquharson, New York, N. Y.

553,320. Electric Register for Sleeping-Car Berths. S. C. Skanks, Toronto, Canada.

553,328. Incandescing Electric Conductors. J. W. Aylsworth, Newark, N. J.

553,330. Electric Gas-Lighting Apparatus. H. W. Brinckerhoff, Brooklyn, N. Y.

553,335. Electric Arc Lamp. E. H. Crosby, Boston, Mass.

553,361. Automatic Toll Box for Telephone Pay Stations. H. C. Root, Brooklyn, N. Y.

553,364. Telephone Call. J. G. Smith, New York, N. Y.

553,446. Magnetic Extracting and Separating Machine. F. J. Barnard, J. C. Moore and J. D. Atkinson, Seattle, Wash.

553,452. Telephone. S. A. Dinsmore, Chicago, Ill.

553,469. Alternating-Current Motor. M. Hutin and M. Leblanc, Paris, France.